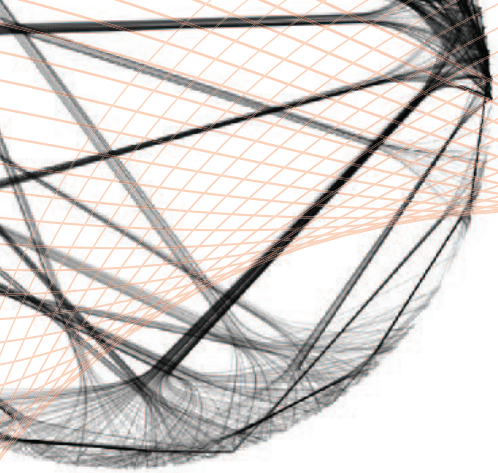
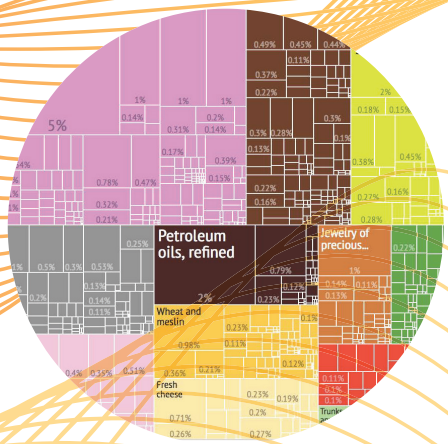
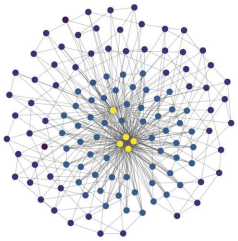


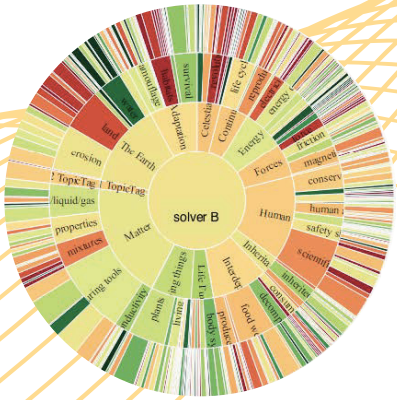
VAST • INFOVIS • SCIVIS

VIS 2017

1-6 OCTOBER 2017
PHOENIX, ARIZONA







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WELCOME

Welcome to IEEE VIS 2017!

After twenty years, we are excited to be returning to Phoenix, Arizona. Located in the Southwest, the city is easy to reach and has wonderful attractions as part of the downtown district near the convention center and conference hotel.

The forum will be held 1-6 October 2017, and will include programs for students, academics, artists, industry and commercial practitioners, government researchers, and anyone with interests in visualization and data analytics. The conference trend has been to draw over 1,000 participants from dozens of countries to a week of research presentations, tutorials, workshops, panels, demonstrations, posters, and exhibitions.

We invite you to participate in IEEE Visual Analytics Science and Technology (VAST), IEEE Information Visualization (InfoVis), IEEE Scientific Visualization (SciVis), and art program, along with a vibrant array of symposia that share our week. Bring your imagination, your data, your problems, your solutions, your research, insights, experience, and enthusiasm.

James Ahrens, *Los Alamos National Laboratory*
VIS 2017 General Chair

Phoenix

Downtown Phoenix is a young and vibrant community. You will find sports arenas, live music, rooftop lounges, museums, theaters, art galleries and more than 100 restaurants. Enjoy a light rail pub crawl, and indulge in Southern cravings, take a slice of the Phoenix pizza scene and more! It has much to offer people from all walks of life. When walking the streets of downtown, if you see a person in an Orange shirt, these are Downtown Ambassadors. They are there to answer questions and provide you with information about the Downtown area. You can also set up walking tours of downtown through the Downtown Ambassador Program. For more information on this program or a general what's happening in Downtown Phoenix, you can visit the Downtown Phoenix website.

Make sure you check out Roosevelt Row! It is the place to go for coffee shops, art-house movies and First Friday Art Walks. Pro sports are almost always afoot away at Talking Stick Resort Arena (formerly known as US Airways Center and home of the Phoenix Suns and Phoenix Mercury) or Chase Field (home of the Arizona Diamondbacks). Downtown Phoenix is full of family-friendly museums including the Arizona Science Center and Heard Museum!

Of course, outside of Phoenix, Arizona has much to offer. Hike Camelback Mountain, visit Old Town Scottsdale, explore the Grand Canyon and Sedona! Explore Arizona's Grand Adventures!

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PHOENIX CONVENTION CENTER

1 Conference Registration

Located on 3rd Fl, 301 Pre-function
Saturday, 6:00–8:00 PM
Sunday & Tuesday, 7:00 AM–4:30 PM
Monday, Wednesday, Thursday, 7:30 AM–4:30 PM
Friday, 7:30–10:30 AM

2 Tutorials, Workshops, Meetups

Located on 1st & 2nd Fl, 101-ABC, 102-ABC, 105-ABC, 106-ABC, 211-AB
Sunday–Monday, 8:30 AM–5:55 PM

3 Conference Sessions

Sunday–Monday, 8:30 AM–5:55 PM
Located on 1st, 2nd, & 3rd Fl, 101-ABC, 102-ABC, 105-ABC, 106-ABC, 207 Lecture Hall, 211-AB, 301-C, 301-D

Tuesday–Thursday, 8:30 AM–5:55 PM &
Friday, 8:30 AM–10:10 AM
101-ABC, 207 Lecture Hall, 301-C, 301-D

Friday, 10:30–11:45 AM
Phoenix Grand Hyatt Ballroom ABCD, map on page 23.

4 Posters and Exhibitions

Located on 3rd Fl, 301-AB
Posters:
Sunday, Wednesday, 8:30 AM–9:00 PM
Monday, Tuesday, Thursday, 8:30 AM–5:55 PM

Exhibitions:
Tuesday, 10:00 AM–5:55 PM
Wednesday, Thursday, 8:30 AM–5:55 PM

5 Arts Program

Located on 3rd Fl, 301-AB
Tuesday, 8:30 AM–9:00 PM
Wednesday, Thursday 8:30 AM–5:55 PM

6 Speaker Preparation

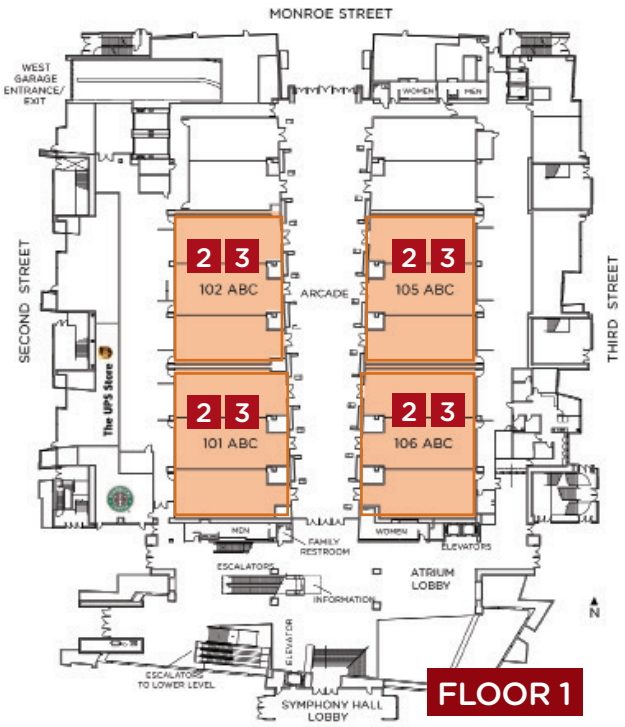
Located on 2nd Fl, 205 & 206
Sunday–Thursday, 8:30 AM–5:55 PM
Friday, 8:30 AM–10:30 PM

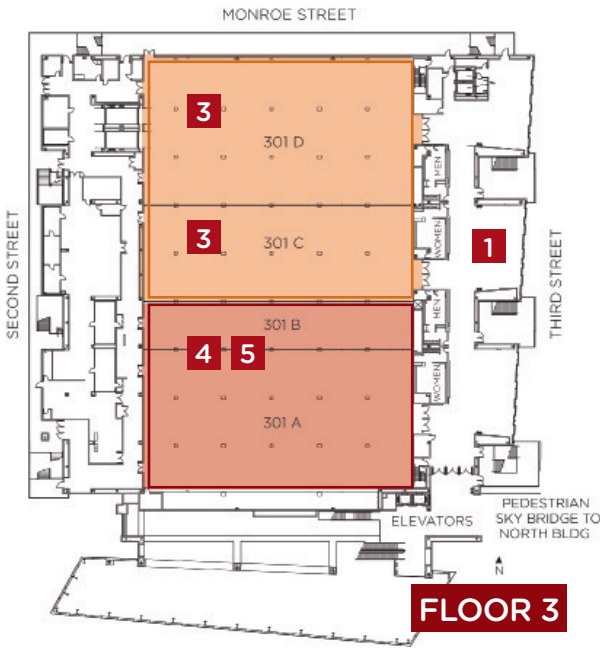
7 Interview Rooms

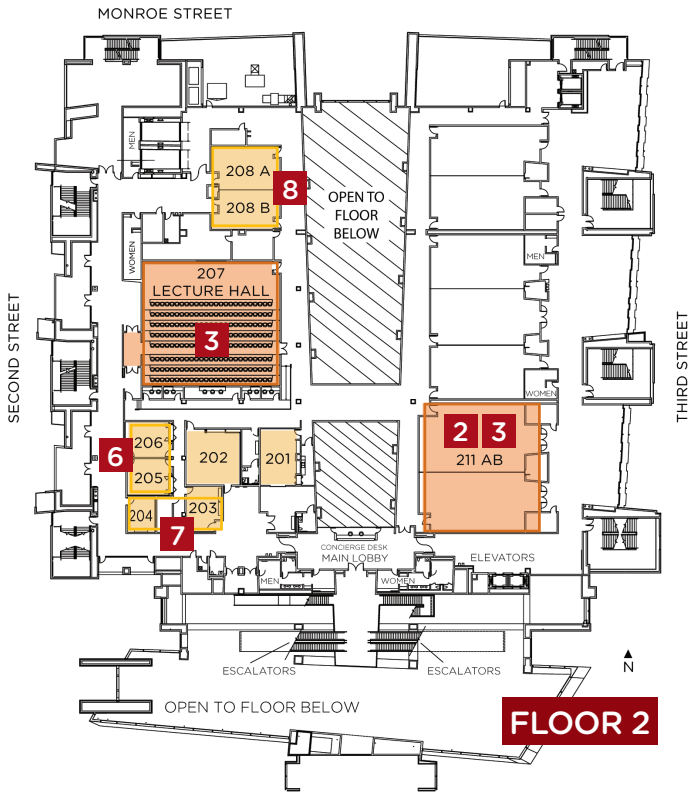
Located on 2nd Fl, 203 & 204
Saturday–Friday, Schedule at Registration Desk

8 VISKids Room

Located on 2nd Fl, 208-AB
Saturday–Thursday, 8:30 AM–5:55 PM
Friday, 8:30–12:00 PM







VIS KEYNOTE AND CAPSTONE

Keynote: Analytics Inspired Visualization: a Holistic In-situ Scientific Workflow at Extreme Scale

Jacqueline H. Chen

Combustion Research Facility at Sandia National Laboratories

Tuesday, 3 October, 2017, 10:50–11:50 AM @ *Room 301-CD*

Abstract

Combustion and turbulence simulations involve highly intermittent localized phenomena that generate high volumes of spatially and temporally varying field and particle data. The current paradigm of posthoc analysis and visualization will become increasingly infeasible as data volumes continue to increase. In the exascale era this problem will be further exacerbated by the difficulty of moving large volumes of data through deep complex memory hierarchies and across the machine network to hard disks on a heterogeneous supercomputer. I will discuss recent advances in in situ massively parallel volume and particle visualization algorithms coupled with analytics – e.g. topological feature segmentation/tracking, distance field construction, multi-variate statistics and eigensolutions of the reaction rate Jacobian - as an integral part of a scientific discovery from high-fidelity combustion simulations. The role of asynchronous task based programming models and runtimes to facilitate an extensible, performance portable computational science workflow at extreme scale will also be discussed in the context of recent turbulent ignition simulations.

Bio

Jacqueline H. Chen is a Distinguished Member of Technical Staff at the Combustion Research Facility at Sandia National Laboratories. She has contributed broadly to research in petascale direct numerical simulations (DNS) of turbulent combustion focusing on fundamental turbulence-chemistry interactions. These benchmark simulations provide fundamental insight into combustion processes and are used by the combustion modeling community to develop and validate turbulent combustion models for engineering CFD simulations. In collaboration with computer scientists and applied mathematicians she was the founding Director of the Center for Exascale Simulation of Combustion in Turbulence (ExaCT). She led an interdisciplinary team to co-design DNS algorithms, domain-specific programming environments, scientific data management and in situ uncertainty quantification and analytics, and architectural simulation and modeling with combustion proxy applications. She is also the PI of a DOE Exascale Simulation Project on Combustion. She received the DOE INCITE Award in 2005-2017, the DOE ALCC Award in 2012, and the 34th International Combustion Symposium Distinguished Paper Award 2012. She is a member of the DOE Advanced Scientific Computing Research Advisory Committee (ASCAC) and Subcommittees on Exascale Computing, and Big Data and Exascale. She was the editor of *Flow, Turbulence and Combustion*, the co-editor of the *Proceedings of the Combustion Institute*, volumes 29 and 30, the Co-Chair of the Local Organizing Committee for the 35th Intl Combustion Symposium, and a member of the Board of Directors of the Combustion Institute.

Capstone: Data Humanism - The Revolution will be Visualized

Giorgia Lupi

Design Director, Accurat

Friday, 6 October 2016, 10:30–11:30 AM @ *Phoenix Grand Hyatt Ballroom ABCD*

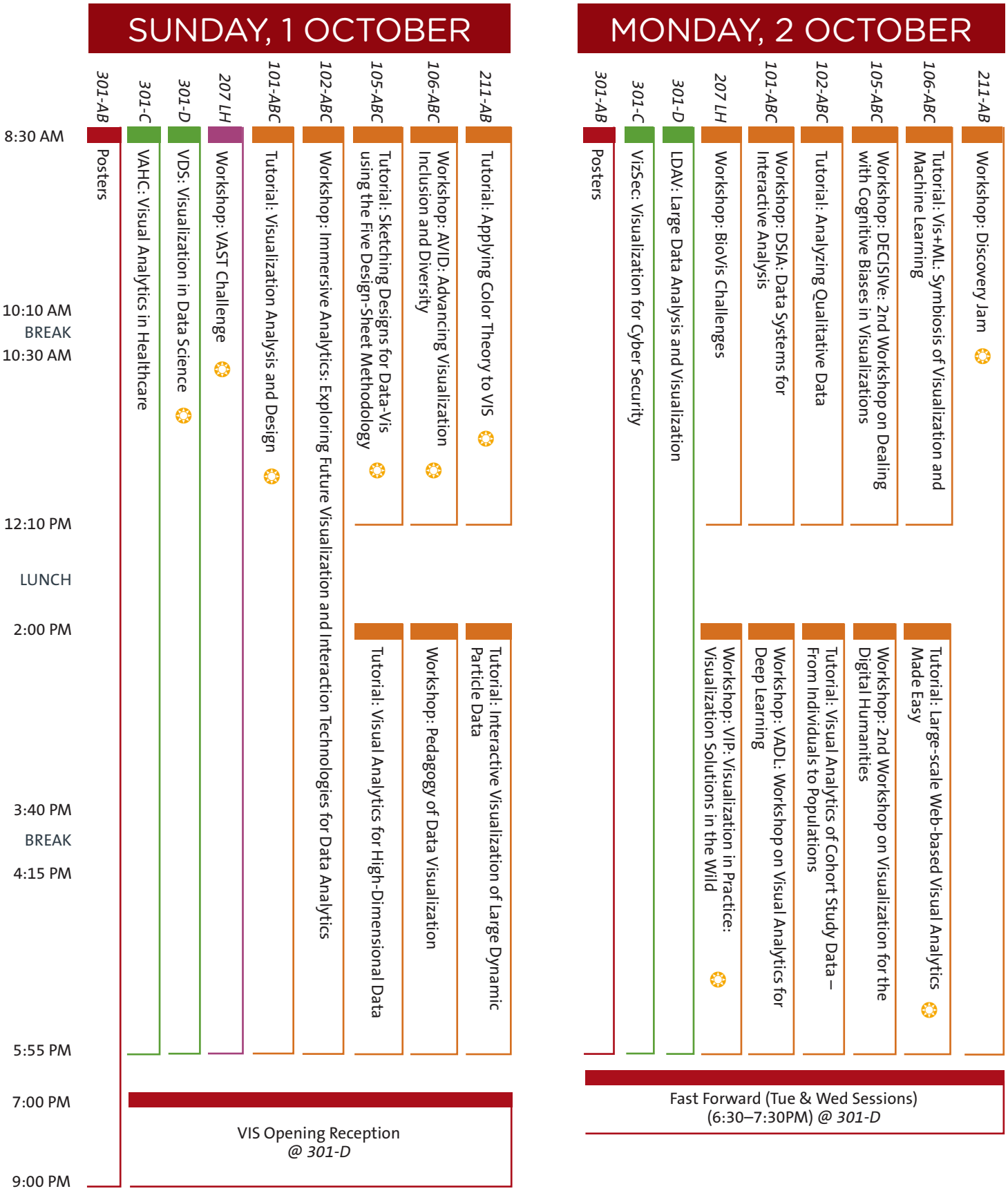
Abstract

It's time to change our minds about data. Data is often perceived as inevitably cold, but instead it can be more than numbers, it can represent real life and it can be a snapshot of the world in the same way that a picture catches small moments in time. The more ubiquitous data becomes, the more we need to experiment with how to make it unique, contextual, intimate; and the way we visualize it is crucial as it is the key to translating numbers into concepts we can relate to. In an aspirational talk, Giorgia will discuss how to see this moment as an opportunity to jumpstart a new renaissance, where we can question the impersonality of a merely technical approach to data, where we are ready to reconnect numbers to what they really stand for: which are more and more our lives.

Bio

Giorgia Lupi is an award winning information designer. She co-founded Accurat, a data-driven design firm with offices in Milan and New York where she is the design director. She received her M-Arch at FAF in Ferrara, Italy, and earned a PhD in Design at Politecnico di Milano. She relocated to New York City from Italy where she now lives. She is co-author of Dear Data, an aspirational hand drawn data visualization book you will find in bookshops in the US (Princeton Architectural Press) and UK (Penguin Random House UK). The original set of postcards has been recently acquired as part of the permanent collection of the Museum of Modern Art. She recently gave a TED TALK on her Humanistic approach to Data.

2017 AT-A-GLANCE



TUESDAY, 3 OCTOBER

	VAST 301-C	INFOVIS 301-D	SCIVIS 207 LH	VIS 101-ABC	VIS
8:00 AM	VIS Welcome (8:00–8:15 AM)				
8:30 AM	VIS Awards & Best Papers 8:15–8:30 AM: VGTC Awards 8:30–9:30 AM: Test of Time Awards 9:30–10:30 AM: VAST, InfoVis, SciVis Best Papers *@301-CD*				Posters @ 301-AB; Art Program @ 301-AB; Exhibits @ 301-AB
10:10 AM					
10:30 AM	BREAK (10:30–10:50 AM)				
	VIS Keynote (10:50–11:50 AM) Analytics Inspired Visualization: a Holistic In-situ Scientific Workflow at Extreme Scale Jacqueline H. Chen, *Sandia* *@301-CD*				
12:10 PM	LUNCH (11:50 AM–1:45 PM)				
1:45 PM	VAST Opening	InfoVis Opening	SciVis Opening		
2:00 PM	Space, Time, Movement	Techniques	Mix: Foundations, Uncertainty, Particles	Panel: VIP - Increasing the Impact of Visualization Research	
3:40 PM	BREAK				
4:15 PM	Graphs and Trees	Time and Space	Volume Rendering	Supporters Presentations	
5:15 PM					
6:00 PM					
6:30 PM	VISAP: Sustain & Decay Exhibition Opening *@ 301-A*				Bill Ribarsky Memorial *@ 101-ABC*
7:00 PM					
7:30 PM					
9:00 PM					

WEDNESDAY, 4 OCTOBER

	VAST 301-C	INFOVIS 301-D	SCIVIS 207 LH	VIS 101-ABC	VIS
8:30 AM	High-dimensional Data	Perception	Flow Visualization	VISAP: Arts Program Session 1	Posters @ 301-AB; Art Program @ 301-AB; Exhibits @ 301-AB
10:10 AM	BREAK				
	ML1: Deep Learning	Design	VAST: Text Analytics	CG&A: Spatio-temporal Applications	
12:10 PM	LUNCH				
2:00 PM	Sequences and Events	Multi-dimensional Data	Topology-based Methods	Panel: Vision Science Meets Visualization	
3:40 PM	BREAK				
4:15 PM	Fast Forward (Thu & Fri Sessions) (4:15–5:15 PM) *@ 301-D*				
5:15 PM	Posters + Networking + Asynchronous Job Fair (5:15–7:00 PM) *@ 301-AB*				
7:00 PM	VIS Banquet (7:00–9:00 PM) *@ 301-D*				
9:00 PM					

THURSDAY, 5 OCTOBER

VAST 301-C	INFOVIS 301-D	SCIVIS 207 LH	VIS 101-ABC	VIS
Visual Representation and Design Study	Text and Machine Learning	Visualization in Biology and Medicine	VISAP: Arts Program Session 2	Posters @ 301-AB Art Program @ 301-AB Exhibits @ 301-AB
BREAK				
Theory and Analysis Process	Trees and Table Tennis	Panel: How Recent ML Advances Impact Visualization Research Agenda	CG&A: Sports Data Visual Analytics	
LUNCH			VIS 2018 Kick-off Meeting	
Interaction in the Analysis Process	Understanding Visualization	SciVis Contest	Panel: Diversity in Visualization	
BREAK				
ML2: Cluster Analysis	Graphs and Paths	VAST: Sensemaking	Panel: Reflection on Reflection in Design Studies	VISKids & VISAP: Dear Data Studio w G. Lupi @ *103-A*

FRIDAY, 6 OCTOBER

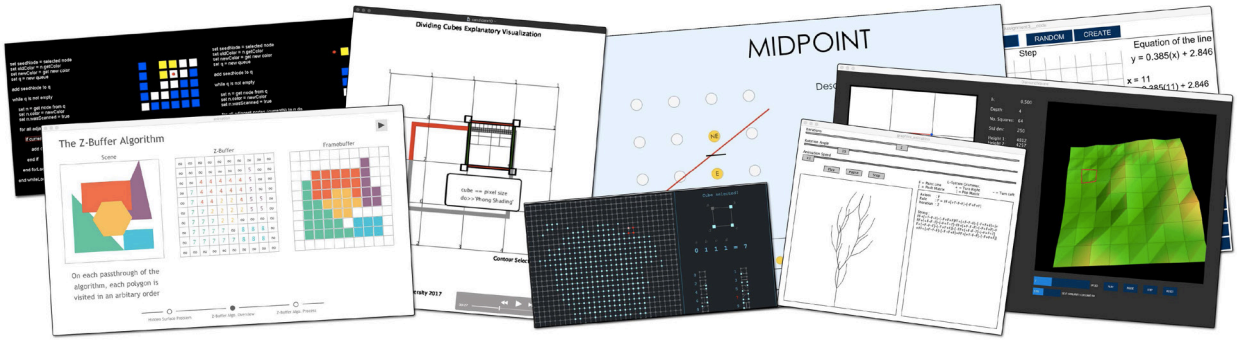
VAST 102-ABC	INFOVIS 105-ABC	SCIVIS 106-ABC	VIS 101-ABC	
ML3: Classification	Evaluation	Applications and Visual Analysis	Panel: A Matter of Scale – Scale Matters	8:30 AM
BREAK *(Located outside of Grand Hyatt Ballroom)*				10:10 AM
VIS Capstone (10:30–11:30 AM) Data Humanism – The Revolution will be Visualized Giorgia Lupi, *Accurat* VIS Closing (11:30–11:45 AM) *@ Phoenix Grand Hyatt Ballroom ABCD*				10:30 AM 11:45 AM
Note: This session takes place in Grand Hyatt Ballroom				12:10 PM

2:00 PM

3:40 PM

4:15 PM

5:55 PM



Recommended for Practitioners

PROGRAM DETAILS

SUNDAY, 1 OCTOBER

Full Day

207 Lecture Hall

Workshop (8:30 AM–5:55 PM)

VAST Challenge

Contributors: 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.

Room 101-ABC

Tutorial (8:30 AM–5:55 PM)

Visualization Analysis and Design

Contributor: 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.

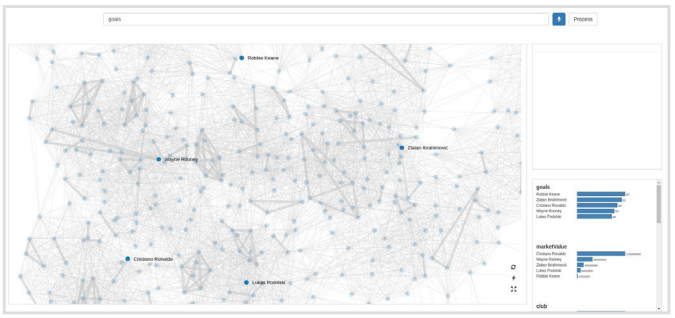
Room 102-ABC

Workshop (8:30 AM–5:55 PM)

Immersive Analytics: Exploring Future Visualization and Interaction Technologies for Data Analytics

Contributors: Benjamin Bach, Maxime Cordeil, Tim Dwyer, Bongshin Lee, Bahador Saket, Alex Endert, Christopher Collins, Sheelagh Carpendale

Immersive Analytics is a new multidisciplinary initiative to explore future visualization and interaction technologies for data analytics. Immersive Analytics aims to bring together researchers in Information Visualization, Visual Analytics, Virtual and Augmented Reality and Natural User Interfaces. This workshop looks at immersive technologies (e.g., AR, VR, Mixed reality, NUIs, large displays), scenarios, theories and frameworks, collaboration, physical and tangible visualization, as well as interaction techniques.



Half Day

Room 105-ABC

Tutorial (8:30 AM–12:10 PM)

Sketching Visualization Designs, and Using the Five Design-Sheet (FdS) Methodology in Teaching

Contributors: Jonathan C. Roberts, Christopher Headleand, Panagiotis Ritsos

This tutorial leads attendees through sketching designs following the Five Design-Sheet methodology (FdS) and discusses how it can be used in teaching. The first part (before the break) will introduce the FdS, place it in context with other methods, discuss creative thinking and different problem types, explain the benefit of sketching designs, and provide a worked example of the FdS. The second part (after the break) focuses on using the FdS in teaching in Higher Education. We give examples of students' work, and discuss issues and challenges of using sketching for designing and prototyping in teaching, followed by a question and answer session.

Room 106-ABC

Workshop (8:30 AM–12:10 PM)

AVID: Advancing Visualization Inclusion and Diversity

Contributors: Penny Rheingans, Kelly Gaither

In the US and in most countries abroad, women account for a relatively small fraction of those earning degrees in computer science. Those from some ethnic backgrounds are also greatly underrepresented. While no specific figures are currently available to describe the diversity of the visualization community, a glance around a typical room during VIS seems to suggest that demographics are similar. Research studies have documented that diverse teams and companies produce better outcomes (more robust designs, more productivity, more profit). This lack of diversity in our community limits our potential. This half-day workshop seeks to address that lack by encouraging undergraduates from underrepresented groups and their allies to consider graduate study and careers in visualization. The workshop includes an overview of the diversity and climate of the visualization community, panels by near peers and senior researchers, and interaction opportunities. Participants should leave the workshop with increased knowledge about opportunities in visualization, a greater understanding of challenges and strategies, and a wider network of those sharing their goals.

Room 211-AB

Tutorial (8:30 AM–12:10 PM)

Applying Color Theory to VIS

Contributor: Theresa-Marie Rhyne

The foundations of color theory & how these methods apply to building effective visualizations are examined. We define color harmony & demonstrate the application of color harmony to case studies. New to this year, we review how mobile devices are advancing to address the full range of color spaces and provide a brief overview of recent color research in the IEEE VIS, ACM SIG CHI and ACM SIGGRAPH communities. Colorization of Black & White digital images using Colorize-It, as presented at the 2016 European Conference on Computer Vision and noted at ACM SIGGRAPH 2017, is demonstrated. We also include our solutions using Colourmap Hospital and Colorgorical tools, introduced at IEEE VIS 2016, as well as new Munsell color harmony work in Visual Analytics. The features of the new Pantone Studio app, ColorBrewer, Colourlover's COPASO tool, Adobe's Capture CC 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 evaluations for color deficiencies using Vizcheck, Coblis & Paletton's Color Scheme Designer. 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.

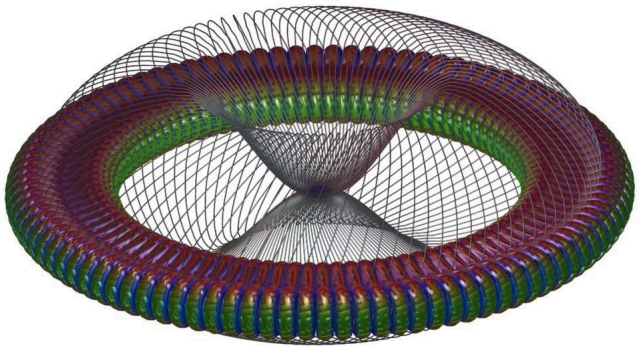
Room 105-ABC

Tutorial (2:00–5:55 PM)

Visual Analytics for High-Dimensional Data

Contributors: Klaus Mueller, Shenghui Cheng

Analyzing high-dimensional data and finding hidden patterns in them is a difficult problem and has attracted numerous research efforts in the visualization community and beyond. Gaining insight into high dimensional data is at the core of big data analysis and data science. Automated methods can be useful to some extent but bringing the data analyst into the loop via interactive visual tools can help the discovery process tremendously. All of these visual tools use some kind of projection strategy to convey the high dimensional space within the confines of the two screen dimensions. Since this projection is an inherently ill-posed problem in all but the most trivial cases, all methods will bear certain trade-offs. Knowing the strengths and weaknesses of the various paradigms existing in the field can inform the design of the most appropriate visualization strategy for the task at hand. It can help practitioners in selecting the best among the many tools available, and it can help researchers in devising new tools to advance the state of the art. This tutorial aims to serve both of these factions of the visualization community.



Room 106-ABC

Workshop (2:00–5:55 PM)

Innovations in the Pedagogy of Data Visualization

Contributors: Alark Joshi, Eytan Adar, Enrico Bertini, Sophie Engle, Marti Hearst, Daniel F. Keefe

The pedagogy of data visualization is becoming increasingly important as data visualization techniques and tools proliferate. In this workshop, we propose to create a community of practice that provides a structured medium to learn from data visualization teaching strategies from each other. The focus is on sharing innovations in the classroom when teaching data visualization. The half-day interactive workshop will include lightning talks/demonstrations followed by breakout sessions focused on topics related to teaching large classes, teaching at a liberal arts college, teaching a professional masters' course, and so on.

Room 211-AB

Tutorial (2:00–5:55 PM)

Interactive Visualization of Large Dynamic Particle Data

Contributors: Martin Falk, Aaron Knoll, Michael Krone, Guido Reina

This half-day tutorial 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 representations 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 as well as CPU-based visualizations that use interactive ray tracing methods for desktop and in situ application scenarios. 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- and CPU-parallelized methods for the generation of application-dependent abstract representations. This includes various representations commonly used in application areas such as structural biology, thermodynamics, and astrophysics.

7:00–9:00 PM

Room 301-D

VIS Opening Reception

VAHC: Visual Analytics in Healthcare

Room 301-C

8:30–8:45 AM

Opening

8:45–9:35 AM

Keynote

Speaker: Hadi Kharrazi, MD, PhD, MHI

Dr. Hadi Kharrazi is a core faculty of Health Policy and Management at the Johns Hopkins Bloomberg School of Public Health with a joint appointment at the Johns Hopkins School of Medicine. He is the research director of the Johns Hopkins Center for Population Health IT (CPHIT) and serves on multiple national advisory boards and steering committees including: the Public Health Informatics Working Group Executive Committee of the American Medical Informatics Association (PHI-WG AMIA), the Steering Committee of the Academy Health's Health IT Interest Group (AH-HIT IG), and the DHHS ONC's Measurement Community of Practice.

9:40–10:10 AM

Fast Forward Presentations (Posters and Demonstrations)

Chair: Jesus J. Caban

10:10–10:30 AM

Coffee Break

10:30–11:10 AM

Papers Session: Population Health, Posters, and Demonstrations

Chair: Theresia Gschwandtner

Patient-Provider Geographic Map: An Interactive Visualization Tool of Patients' Selection of Health Care Providers, Zhongyuan Yu, Kara Pepe, George Rust, Jose Emmanuel Ramirez-Marquez, Shun Zhang, Bryan Bonnet

PandemCap: Decision Support Tool for Epidemic Management, Andrea Yañez, Jim Duggan, Conor Hayes, Musfira Jilani, Maire Connolly

11:10 AM–12:10 PM

Posters and Live Demonstrations

12:10–2:00 PM

Lunch Break

2:00–3:40 PM

Papers Session: Visualization of Longitudinal Series

Chair: Jurgen Bernard

Aiding Infection Analysis and Diagnosis Through Temporally-Contextualized Matrix Representations, Maksim Gomov, Jia-Kai Chou, Jianping Kelvin Li, Soman Sen, Kiho Cho, Nam Tran, Kwan-Liu Ma

Visual Analytics for Evaluating Clinical Pathways, Humberto S. Garcia Caballero, Alberto Corvò, Prabhakar M. Dixit, Michel A. Westenberg

Echo: A Large Display Interactive Visualization of ICU Data for Effective Care HandOffs, Manu Mathew Thomas, Thomas Kannampallil, Joanna Abraham, G. Elisabeta Marai

A Timeline-based Framework for Aggregating and Summarizing Electronic Health Records, Filip Dabek, Elizabeth Jimenez, Jesus J. Caban

Visual Tools for the Exploration of Growth Data in a Cohort of Kangaroo Infants During their First Year of Life, Deisy Díaz, Julieta Villegas, John Alexis Guerra-Gomez, Nathalie Charpak, José Tiberio Hernández

3:40–4:15 PM

Coffee Break

4:15–5:50 PM

Clinical Applications

Chair: Jeremy Warner

Using Network Graphs to Visualize Changing Documentation Styles in an Oncology Practice Before and After OpenNotes Implementation, Sandeep K. Jain, Maryam Rahimian, Robin M. Joyce, Jessica A. Zerillo, Jeremy L. Warner

RadStream: An Interactive Visual Display of Radiology Workflow for Delay Detection in the Clinical Imaging Process, Felwa Abukhodair, Khalid Khashoggi, Tim O'Connell, Chris Shaw

PathoVA: A Visual Analytics Tool for Pathology Diagnosis and Reporting, Alberto Corvò, Marc A. van Driel, Michel A. Westenberg

Visual Analytics for Radiomics: Combining Medical Imaging with Patient Data for Clinical Research, Andreas Bannach, Jürgen Bernard, Florian Jung, Jörn Kohlhammer, Thorsten May, Kathrin Scheckenbach, Stefan Wesarg

DataScope: Interactive Visual Exploratory Dashboards For Large Multidimensional Data, Ganesh Iyer, Sapoonjyoti DuttaDuwarah, Ashish Sharma

5:50–5:55 PM

Closing

7:00–9:00 PM

Room 301-D

VIS Opening Reception

VDS: Visualization in Data Science

Room 301-D

8:30–8:40 AM

Opening

8:40–9:40 AM

Keynote

Challenges in Data Science

Speaker: Hadley Wickham, *RStudio*

In this talk, I'll outline my vision of data science as a field, focusing on the corner in which I'm most familiar: designing tools for data scientist-programmers. I'll talk about why I believe programming is so important for data science, why code is an excellent medium of computation, and outline some of the challenges that visual tools face. I'll also talk about data science challenges where programming doesn't help or feels excessively clumsy, and speculate on how we might fuse the best of programmatic and interactive UIs.

9:40–10:10 AM

Papers Session

Chair: Carlos Scheidegger

Visual Analysis of Spatio-Temporal Event Predictions: Investigating the Spread Dynamics of Invasive Species, Daniel Seebacher, Johannes Häußler, Michael Hundt, Manuel Stein, Hannes Mülller, Ulrich Engelke, Daniel A. Keim

Clear Visual Separation of Temporal Event Sequences, Andreas Mathisen, Kaj Grønbæk

10:10–10:30 AM

Coffee Break

10:30–11:30 AM

Keynote

When Should We Trust Autonomous Learning Systems with Decision Making?

Speaker: Vasant Dhar, *New York University*

As autonomous learning machines become a bigger part of our lives, we need a framework for evaluating which decisions we should be comfortable delegating to learning algorithms and which ones humans should retain. It is surprising that no such framework has existed, given the high stakes involved. I describe a risk-oriented framework for deciding when and how to allocate decision problems between humans and machine-based decision makers. The framework is based on the experiences that my collaborators and I have had implementing prediction systems over the last 25 years in domains like finance, healthcare, education, and sports. I also explore the different roles visualization can play in autonomous learning systems.

11:30 AM–12:10 PM

Papers Session

Chair: Marc Streit

[Best Paper] **Visual Integration of Data and Model Space in Ensemble Learning,** Bruno Schneider, Dominik Jäckle, Florian Stoffel, Alexandra Diehl, Johannes Fuchs, Daniel A. Keim

Visualization of Big Spatial Data using Coresets for Kernel Density Estimates, Yan Zheng, Yi Ou, Alexander Lex, Jeff M. Phillips

Visual Progression Analysis of Student Records Data, Mohammad Raji, John Duggan, Blaise DeCotes, Jian Huang, Bradley Vander Zanden

12:10–2:00 PM

Lunch Break

2:00–2:55 PM

Panel

Chair/Moderator: Daniel A. Keim

The Value of the Human in the Data Science Process, Jeff Phillips, Hadley Wickham, Vasant Dhar, Fernanda Viegas, Martin Wattenberg

2:55–3:40 PM

Papers Session

CancerLinker: Explorations of Cancer Study Network, Vinh Nguyen, Md Yasin Kabir, Tommy Dang

Crop Planning using Stochastic Visual Optimization, Gunjan Sehgal, Bindu Gupta, Kaushal Paneri, Karamjit Singh, Geetika Sharma, Gautam Shroff

Visualizing Sensor Network Coverage with Location Uncertainty, Tim Sodergren, Jessica Hair, Jeff Phillips, Bei Wang

3:40–4:15 PM

Coffee Break

4:15–4:40 PM

Short Talks

Chair: Adam Perer

4:40–5:40 PM

Keynote

Visualization: The Secret Weapon For Machine Learning

Speakers: Fernanda Viegas and Martin Wattenberg, *Google*

Machine learning is playing an increasingly influential role in the world, due to dramatic technical leaps in recent years. But these new developments bring their own questions. What is the best way to train models and to debug them? How can we understand what is going on under the hood of deep neural networks? It turns out that visualization can play a central role in answering these questions. We'll discuss recent work that shows how interactive exploration can help people use, interpret, and learn about machine intelligence.

5:40–5:55 PM

Closing

7:00–9:00 PM

Room 301-D

VIS Opening Reception

MONDAY, 2 OCTOBER

Full Day

Room 211-AB

Workshop (8:30 AM–5:55 PM)

Discovery Jam

Contributors: David Rogers, Daniel F. Keefe, Francesca Samsel, Miriah Meyer, Cecilia Aragon

You've heard of Game Jams and Hack-a-thons–DiscoveryJam brings this same intense, hands-on approach to scientific discovery. Our full day workshop brings scientists together with VIS participants in an interactive day-long workshop to create innovative approaches to scientific discovery problems. Each DiscoveryJam scientist is matched with a small group of attendees. In the morning each group holds interactive discussions with their scientist about specific data and science problems. In the afternoon, each group hacks away on the scientist's data. We'll create sketches, prototypes, and sample visualizations, and then present them to the entire workshop. You'll leave the workshop with skills for communicating with scientists, approaches to cross-disciplinary collaboration, and research ideas to pursue further. Bring your laptop and your favorite vis tools to dig into data with us.

Half Day

207 Lecture Hall

Workshop (8:30 AM–12:10 PM)

BioVis Challenges

Contributors: Cagatay Turkay, Nils Gehlenborg, Marc Streit, Jan Aerts

The rapidly expanding field of biology creates enormous challenges for data visualization techniques that enable researchers to gain insight from their large and highly complex data sets. BioVis Challenges Workshop is a half-day event focusing this year on challenges related to the Visualization of Cancer Genomics Data—a state-of-the-art biological challenge that requires a concerted effort from researchers in visualisation and biology to be addressed effectively. The event will be kicked-off with a keynote from a biology expert where a series of challenges are presented, and followed by hands-on activity on these challenges by groups of visualisation researchers and domain scientists. The output of the workshop will be a list of well-characterized visualization challenges within the problem domain. The organizers, together with the participants, will externalize these challenges in the form of a report or publication following the event.

Room 101-ABC

Workshop (8:30 AM–12:10 PM)

DSIA: Data Systems for Interactive Analysis

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

DSIA brings together researchers at the intersection of databases, machine learning, and interactive visualization. These three areas have important things to say to each other. Modern data visualization depends on the cutting edge of both database and machine learning research: database researchers are exploring techniques for storing and querying massive amounts of data; machine learning techniques provide ways to discover unexpected patterns and to automate and scale well-defined analysis procedures. This workshop explores 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 increase cross-pollination between these fields.

Room 102-ABC

Tutorial (8:30 AM–12:10 PM)

Analyzing Qualitative Data

Contributors: Sheelagh Carpendale, Uta Hinrichs, Søren Knudsen, Alice Thudt, Melanie Tory

Evaluation is increasingly recognized as an essential component of visualization research. However, evaluation itself is a changing research area. In particular, the many variations of qualitative research are emerging as important empirical methods. This half-day tutorial is designed for beginning to intermediate audiences. We will focus on the basic methods for analyzing qualitative data using a mixture of talks and hands-on activities. In particular we will consider closed and open coding as well as clustering and categorizing coded data. After completing this tutorial, attendees will have a richer understanding of the benefits and challenges of qualitative empirical research and, more specifically, how to analyze qualitative data.

Room 105-ABC

Workshop (8:30 AM–12:10 PM)

DECISIVe 2017: Dealing with Cognitive Biases in Visualizations

Contributors: Geoffrey Ellis, Evanthia Dimara, Donald Kretz, Alex Endert

We make thousands of subconscious decisions daily and often apply simplified rules or heuristics to speed up the process. Most of these are good enough, however when there is some uncertainty we can make what appears to be irrational decisions, leading to inaccurate judgements, also known as cognitive biases. Over the last 40 years, hundreds of cognitive biases have been documented, such as the confirmation bias, where people unconsciously seek out information that confirms their current belief, ignoring information to the contrary. Despite a growing awareness of the detrimental effects of cognitive biases on decision making, there is little work on how to detect this behaviour in those who use visualisation-based applications and even less on how to minimise their effect. The aim of this workshop is to bring together people from a wide range of disciplines such as information visualisation, visual analytics, software engineering, cognitive psychology and decision science, as well as those close to end-user groups like intelligence analysts and medical practitioners, to explore some of the ways in which cognitive biases impact user performance and share ideas about practical ways to reduce or overcome these potentially harmful effects, especially in adapting the tools developers design and build.

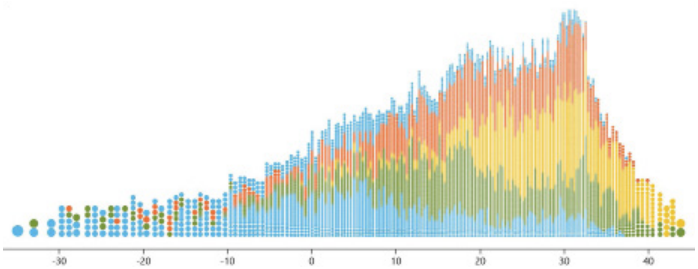
Room 106-ABC

Tutorial (8:30 AM–12:10 PM)

Vis+ML: Symbiosis of Visualization and Machine Learning

Contributors: Abon Chaudhuri, Yifan Hu, Xiaotong Liu, Yang Wang

Visualization and machine learning (ML) have come close to each other in recent years more than ever before. Visualization has emerged as a popular technique to understand the inner working and performance of machine learning and of late, deep learning algorithms. At the same time, machine learning techniques such as dimensionality reduction, clustering, and classification have been



used on a regular basis to transform large datasets to representations well-suited for visual exploration. As a result, both research fields have witnessed significant growth in the literature in recent years. The number of initiatives in the forms of workshops, panels, and open source releases to bring these two communities together have been growing as well. We propose to contribute to this developing body of knowledge with a half-day tutorial at IEEE VIS 2017. The proposed tutorial offers a concise yet complete coverage of the recent exchange of ideas and techniques between these two fields. Using engaging case studies and demos based on our previous and ongoing work, we plan to highlight how visualization and ML techniques (both supervised and unsupervised) are used hand-in-hand to understand hidden patterns in various types of structured and unstructured data. This tutorial should appeal to researchers and practitioners alike since it plans to discuss the inception of new techniques in the visualization or machine learning research community as well as their applications in the big data and software industry.

207 Lecture Hall

Workshop (2:00–5:55 PM)

VIP: Vis in Practice: Visualization Solutions in the Wild

Contributors: Bernd Hentschel, Daniela Oelke, Justin Talbot

This workshop is an opportunity for visualization practitioners and researchers to meet and share experiences, insights, and ideas in applying the latest visualization and visual analytics research to real world problems. VIP targets work at the interface between visualization research and specific application domains. It is highly interdisciplinary and focused on delivering actual value to users. This year, we specifically focus on visualization solutions in the wild, i.e. on tools, systems, or frameworks, which are actively used. The workshop will cover all aspects from their initial conception and design, the process of getting them into use, and the long-term work of extending and sustaining them.

Room 101-ABC

Workshop (2:00–5:55 PM)

VADL 2017: Workshop on Visual Analytics for Deep Learning

Contributors: Jaegul Choo, Shixia Liu, Jason Yosinski, Deokgun Park

VADL 2017, the workshop on visual analytics for deep learning, is a half-day workshop held in conjunction with the IEEE VIS 2017 Conference. The primary goal of the workshop is to bridge the gap by bringing together researchers from both the machine learning and visual analytics fields, which allows us to push the boundary of deep learning. The workshop should provide an opportunity to discuss and explore ways to harmonize the power of automated techniques and exploratory nature of interactive visualization.

Room 102-ABC

Tutorial (2:00–5:55 PM)

Visual Analytics of Cohort Study Data – From Individuals to Populations

Contributors: Steffen Oeltze-Jafra, Uli Niemann, Jürgen Bernard, Adam Perer

Medicine is one of the primary drivers of visualization research and medical visualization is a vibrant and successful field with a tradition of dozens of years. Traditionally, a lot of medical visualization research has been focused on the visualization of data obtained from a single individual, i.e. a single, uni-modal patient dataset, being usually defined on a regular grid in 3D and capturing a selected part of the human anatomy. In recent years, however, the most pressing challenges in medical visualization have broadened including the investigation of data obtained from populations. Large pools of image and non-image data are acquired for hundreds to thousands of individuals and their analysis poses tremendous new challenges. These include the blending of analysis and visualization techniques to make sense out of this big data, the combined visualization of image and non-image data, the integrated visualization of very heterogeneous data as well as the effective and efficient interactive exploration of the data.

Room 105-ABC

Workshop (2:00–5:55 PM)

2nd Workshop on Visualization for the Digital Humanities

Contributors: Stefan Janicke, Christopher Collins, Michael Correll, Mennatallah El-Assady, Daniel A. Keim, David Wrisley

The first Workshop on Visualization for the Digital Humanities at VIS 2016 created a new platform to discuss challenges in the emerging digital humanities field. The 2nd workshop this year aims (1) to single out new research directions in visualization for the digital humanities, (2) to familiarize the visualization research community with the problems faced by digital humanities researchers, and (3) to establish future collaborations between visualization and digital humanities scholars.

Room 106-ABC

Tutorial (2:00–5:55 PM)

Large-scale Web-based Visual Analytics Made Easy

Contributors: Xiaoji Chen, Shan He, Lezhi Li, Yang Wang

The advancement of almost every modern domain depends on data. Companies and organizations invest heavily in infrastructure for data storage and processing, but unless they are able to extract meaning from the data, the investment is a sunk cost with little reward. Visualization, as an effective means of bridging human knowledge and data to drive decisions, has gained popularity in recent years. Nonetheless, despite the amount of effort being put forth by the community, it is still nontrivial for scientists and practitioners to quickly create actionable visualizations with data at scale that are also reusable and beneficial in the long-term. To narrow this gap, we present a series of hands-on tutorials distilled from inter-/external workshops. We start by introducing a "primitive-instancing-layering" (PIL) paradigm for architecting visualizations, followed by an overview of a set of open-source frameworks sharing the same design concept. We then showcase real-world examples distilled from our day-to-day work covering both geospatial and non-geospatial use cases, together with lessons learned from developing data-heavy visual analytics tools in an enterprise setting. Finally, we incorporate a deep dive into advanced topics on layer customization and performance optimizations for more advanced use cases. In the course of the tutorial, we expect the attendees to become acquainted with patterns on how to architect a visualization, and to be able to quickly prototype and verify ideas leveraging these open-source frameworks. We believe the hands-on experiences together with the best practices from an industry perspective will complement the IEEE VIS Tutorials, which are often structured in favor for academic scenarios. We also envision that our tutorial will benefit both researchers and practitioners providing building blocks to jump-start their projects and will bring in more people to contribute to the visualization community.

6:30–7:30 PM

301 D

VIS Fast Forward (Tue & Wed Sessions)

VizSec: Visualization for Cyber Security

Room 301-C

8:30–8:45 AM

Opening Remarks

8:45–9:45 AM

Keynote

Speaker: Alexander Anthony Gates, *Director, Cyber Directorate, Office of Intelligence and Counterintelligence, U.S. Department of Energy*

Maintaining Context

What is the most difficult challenge to using visualization tools to obtain and maintain cyber situational awareness? Is it the data? Analytics? Stale dashboards or displays? Users? My vote is context. Visualization tools often fail to obtain significant adoption or user acceptance because the context obtained at one level of sharing (strategy, operational, tactical, or technical) is lost when viewed by different people, teams, or at a different level. Developing visualization strategies and tools that enable users to integrate data and information while maintaining context through the various levels of sharing is critical to achieving useful situational awareness in cyber and can be a vital feature in advancing the art of cyber security.

9:45–10:10 AM

VizSec Poster Fast Forward

Please see page 27 for the list of accepted posters.

10:10–10:30 AM

Coffee Break

10:30 AM–12:10 PM

Papers Session: Intrusion Detection

Firewall Ruleset Visualization Analysis Tool Based on Segmentation, Hyungseok Kim, Sukjun Ko, Dong Seong Kim, Huy Kang Kim

Network-Wide Intrusion Detection Supported by Multivariate Analysis and Interactive Visualization, Roberto Theron, Roberto Magán-Carrión, José Camacho, Gabriel Maciá Fernández

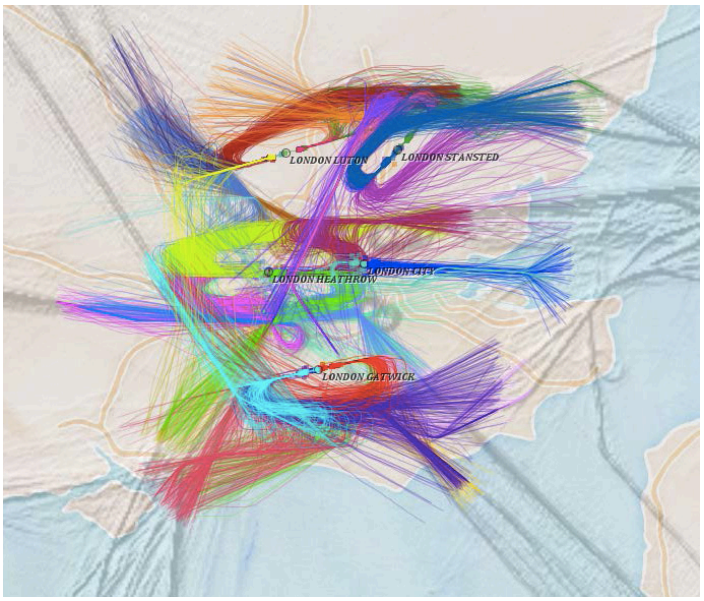
Papers Session: Malware

The Goods, the Bads and the Uglies: Supporting Decisions in Malware Detection through Visual Analytics, Marco Angelini, Leonardo Aniello, Simone Lenti, Giuseppe Santucci, Daniele Ucci

Interactive Visualization Toolbox to Detect Sophisticated Android Malware, Ganesh Ram Santhanam, Benjamin Holland, Suresh Kothari, Jon Mathews

12:10–2:00 PM

Lunch Break



2:00–3:40 PM

Papers Session: Design

[Best Paper Award, Sponsored by Two Six Labs] Towards Designing Effective Visualizations for DNS-Based Network Threat Analysis, Rosa Romero-Gómez, Yacin Nadji, Manos Antonakakis

Toward a Design Space for Cyber Security Visualizations Using Threat Models and Human-Centered Design, Lyndsey Franklin, Megan Pirrung, Michelle Dowling, Mi Feng, Leslie Blaha

Papers Session: Security Frameworks

Expert-Interviews Led Analysis of EEVi - A Model for Effective Visualization in Cyber-Security, Aneesha Sethi, Gary Wills

CRUMBS: A Cyber Security Framework Browser, Marco Angelini, Simone Lenti, Giuseppe Santucci

3:40–4:15 PM

Coffee Break

4:15–4:55 PM

Papers Session: Short Papers

STARLORD: Linked Security Data Exploration in a 3D Graph, Laetitia Leichtnam, Eric Totel, Nicolas Prigent, Ludovic Mé

Adversarial-Playground: A Visualization Suite Showing How Adversarial Examples Fool Deep Learning, Andrew P. Norton, Yanjun Qi

4:55–5:55 PM

Panel and Closing

Please visit vizsec.org for more details on the panel.

MONDAY

LDAV: Large Data Analysis and Visualization

Room 301-D

8:30–8:55 AM

Opening and Fast Forward

8:55–10:10 AM

Papers Session: Multicore Techniques

Techniques for Data-Parallel Searching for Duplicate Elements, Brenton Lessley, Kenneth Moreland, Matthew Larsen, Hank Childs

Task-based Augmented Merge Trees with Fibonacci Heaps, Charles Gueunet, Pierre Fortin, Julien Jomier, Julien Tierny

Maximal Clique Enumeration with Data-Parallel Primitives, Brenton Lessley, Talita Perciano, Manish Mathai, Hank Childs, E. Wes Bethel

10:10–10:30 AM

Coffee Break

10:30–10:55 AM

Papers Session: Sampling Techniques

Sampling Techniques to Improve Big Data Exploration, Julian A. Ramos Rojas, Mary Beth Kery, Stephanie Rosenthal, Anind Dey

10:55 AM–12:10 PM

Keynote

Speaker: Ulrich Rüde

12:10–2:00 PM

Lunch Break

2:00–3:40 PM

Papers Session: Interactive Visualization / In Situ Techniques

Interactive Visualization of High-Dimensional Petascale Ocean Data, David A. Ellsworth, Christopher E. Henze, Bron C. Nelson

Scalable Web-Embedded Volume Rendering, Mohammad Raji, Alok Hota, Jian Huang

Using Feature Importance Metrics to Detect Events of Interest in Scientific Computing Applications, Julia Ling, W. Philip Kegelmeyer, Konduri Aditya, Hemanth Kolla, Kevin A. Reed, Timothy M. Shead, Warren L. Davis IV

In Situ Video Encoding of Floating-Point Volume Data Using Special-Purpose Hardware for a Posteriori Rendering and Analysis, Nick Leaf, Bob Miller, Kwan-Liu Ma

3:40–4:15 PM

Coffee Break

4:15–5:05 PM

Papers Session: Distributed Memory Techniques

GraphRay: Distributed Pathfinder Network Scaling, Alessio Arleo, Oh-Hyun Kwon, Kwan-Liu Ma

Parallel Multi-Level Ghost Cell Generation for Distributed Unstructured Grids, John M. Patchett, Boonthanome Nouanesengesy, Joachim Pouderoux, James Ahrens, Hans Hagen

5:05–5:45 PM

Panel

5:45–5:55 PM

Best Paper Awards and Closing

Papers: *TVCG*-VIS Partnership

The proceedings of VAST, InfoVis, and SciVis are published as a special issue of the flagship journal IEEE *Transactions on Visualization and Computer Graphics* (*TVCG*). The special issue has the publication date of January in the following year and is published online the first day of the conference, with Early Access preprints publicly available before VIS at https://www.computer.org/csdl/trans/tg/preprint/index.html. All authors of regular *TVCG* papers from the previous year in the area of visualization have been invited to give an oral presentation about their work at VIS; these talks are integrated within the topical papers sessions. This closely coupled relationship between *TVCG* and VIS supports the timely exchange of new ideas and rapid dissemination of visualization research via an integrated forum for both publications and presentations.

The VAST Conference-only Track features additional papers with innovative advances and applications in visual analytics that may have focused outside the scope of *TVCG*; these full archival papers will appear in the IEEE Digital Library. These talks are also integrated within the topical papers sessions.

In addition, authors of papers from the IEEE *Computer Graphics and Applications* (*CG&A*) from the previous year in the area of visualization have been invited to give an oral presentation about their work at VIS; these talks are collected into two *CG&A*-focused sessions.

TUESDAY, 3 OCTOBER

8:00–10:30 AM

Room 301-CD

VIS Welcome (8:00-8:15 AM)

VGTC Awards (8:15-8:30 AM)
Chair: Cláudio T. Silva

2017 VGTC Visualization Career Award, Charles Hansen

2017 VGTC Visualization Technical Achievement Award, Jeffrey Heer

Test of Time Awards (8:30-9:30 AM)
Chair: Test of Time Award Committees

[VAST 2007: 10 Year Test of Time Award] Jigsaw: Supporting Investigative Analysis through Interactive Visualization, John T. Stasko, Carsten Görg, Zicheng Liu, Kanyupriya Singhal

[InfoVis 1997: 20 Year Test of Time Award] The Structure of the Information Visualization Design Space, Stuart K. Card, Jock D. Mackinlay

[InfoVis 2007: 10 Year Test of Time Award] ManyEyes: a Site for Visualization at Internet Scale, Fernanda B. Viégas, Martin Wattenberg, Frank van Ham, Jesse Kriss, Matt McKeon

[SciVis 1992: 25 Year Test of Time Award] Visualization of Second Order Tensor Fields and Matrix Data, Thierry Delmarcelle, Lambertus Hesselink

[SciVis 2002: 15 Year Test of Time Award] Efficient Computation of theTopology of Level Sets, Valerio Pascucci, Kree Cole-McLaughlin

Best Paper Awards and Talks (9:30-10:30AM)
Chair: Best Paper Award Committees

[J] [VAST Best Paper Award] Visualizing Dataflow Graphs of Deep Learning Models in TensorFlow, Kanit Wongsuphasawat, Daniel Smilkov, James Wexler, Jimbo Wilson, Dandelion Mané, Doug Fritz, Dilip Krishnan, Fernanda B. Viégas, Martin Wattenberg

[J] [InfoVis Best Paper Award] Modeling Color Difference for Visualization Design, Danielle Albers Szafir

[J] [SciVis Best Paper Award] Globe Browsing: Contextualized Spatio-Temporal Planetary Surface Visualization, Karl Bladin, Emil Axelsson, Erik Broberg, Carter Emmart, Patric Ljung, Alexander Bock, Anders Ynnerman

10:30–10:50 AM

Coffee Break

10:50–11:50 AM

Room 301-CD

VIS Keynote

Speaker: Jacqueline H. Chen, *Sandia National Laboratories*

Analytics Inspired Visualization: a Holistic In-situ Scientific Workflow at Extreme Scale
Please see p.4 for Keynote details.

11:50 AM–1:45 PM

Lunch Break

1:45–3:40 PM

Room 301-C

VAST Opening (1:45-2:00 PM)
Chairs: Brian Fisher, Shixia Liu, Tobias Schreck

VAST Papers
Space, Time, Movement
Chair: Bettina Speckmann

[J] Bring it to the Pitch: Combining Video and Movement Data to Enhance Team Sport Analysis, Manuel Stein, Halldor Janetzko, Andreas Lamprecht, Thorsten Breitkreutz, Philipp Zimmermann, Bastian Goldlücke, Tobias Schreck, Gennady Andrienko, Michael Grossniklaus, Daniel A. Keim

[J] Voila: Visual Anomaly Detection and Monitoring with Streaming Spatiotemporal Data, Nan Cao, Chaoguang Lin, Qiuhan Zhu, Yu-Ru Lin, Xian Teng, Xidao Wen

[J] Clustering Trajectories by Relevant Parts for Air Traffic Analysis, Gennady Andrienko, Natalia Andrienko, Georg Fuchs, Jose Manuel Cordero Garcia

[T] Revealing Patterns and Trends of Mass Mobility through Spatial and Temporal Abstraction of Origin-Destination Movement Data, Gennady Andrienko, Natalia Andrienko, Georg Fuchs, Jo Wood

[T] Data Flow Analysis and Visualization for Spatiotemporal Statistical Data without Trajectory Information, Seokyeon Kim, Seongmin Jeong, Insoo Woo, Yun Jang, Ross Maciejewski, David Ebert

Room 301-D

InfoVis Opening (1:45-2:00 PM)
Chairs: Tim Dwyer, Niklas Elmqvist, Steve Franconeri

InfoVis Papers
Techniques
Chair: Yvonne Jansen

[J] Visualizing Nonlinear Narratives with Story Curves, Nam Wook Kim, Benjamin Bach, Hyejin Im, Sasha Schriber, Markus Gross, Hanspeter Pfister

[J] MyBrush: Brushing and Linking with Personal Agency, Philipp Koytek, Charles Perin, Jo Vermeulen, Elisabeth André, Sheelagh Carpendale

[J] Nonlinear Dot Plots, Nils Rodrigues, Daniel Weiskopf

[J] VisTiles: Coordinating and Combining Co-located Mobile Devices for Visual Data Exploration, Ricardo Langner, Tom Horak, Raimund Dachselt

[T] Uncertainty Visualization by Representative Sampling from Prediction Ensembles, Le Liu, Alexander Boone, Ian Ruginski, Lace Padilla, Mary Hegarty, Sarah H. Creem-Regehr, William B. Thompson, Cem Yuksel, Donald H. House

207 Lecture Hall

SciVis Opening (1:45-2:00 PM)
Chairs: Ingrid Hotz, Mike Kirby, Xiaoru Yuan

SciVis Papers
Mix: Foundations, Uncertainty, Particles
Chair: Anna Vilanova

[J] Activity-Centered Domain Characterization for Problem-Driven Scientific Visualization, G. Elisabeta Marai

[J] The Good, the Bad, and the Ugly: A Theoretical Framework for the Assessment of Continuous Colormaps, Roxana Bujack, Terece L. Turton, Francesca Samsel, Colin Ware, David H. Rogers, James Ahrens

[J] TVCG journal special issue papers [C] Conference papers [T] TVCG journal previously published papers

[J] Uncertainty Visualization Using Copula-Based Analysis in Mixed Distribution Models, Subhashis Hazarika, Ayan Biswas, Han-Wei Shen

[J] Screen-Space Normal Distribution Function Caching for Consistent Multi-Resolution Rendering of Large Particle Data, Mohamed Ibrahim, Patrick Wickenhäuser, Peter Rautek, Guido Reina, Markus Hadwiger

[J] Dynamic Load Balancing Based on Constrained K-D Tree Decomposition for Parallel Particle Tracing, Jiang Zhang, Hanqi Guo, Fan Hong, Xiaoru Yuan, Tom Peterka

Room 101-ABC

VIS Panel

VIP–Increasing the Impact of Visualization Research

Panelists: Steven M. Drucker, Adam Perer, Daniela Oelke, Melanie Tory, Krist Wongsuphasawat, Justin Talbot

The Vis in Practice panel is part of the IEEE VIS 2017 main program and provides visualization researchers and practictioners with the chance to hear from leaders in the field. This year our panelists will discuss how visualization research impacts industry. The panelists have deep and diverse experience applying ideas from the research domain to visualization problems and products within industry. The panelists will provide their perspectives on questions such as: What visualization papers or threads of research have had particular impact on your industry? When developing new features or systems, to what extent do you turn to existing research to inform your decisions? What types of papers are most relevant to your work? What makes a paper more or less applicable? Are there general visualization questions that are of critical interest to your company that are not currently being addressed by the research community?

3:40–4:15 PM

Coffee Break

4:15–5:55 PM

Room 301-C

VAST Papers

Graphs and Trees

Chair: Stephen Kouborov

[J] Dynamic Influence Networks for Rule-based Models, Angus G. Forbes, Andrew Burks, Kristine Lee, Xing Li, Pierre Boutillier, Jean Krivine, Walter Fontana

[J] BiDots: Visual Exploration of Weighted Biclusters, Jian Zhao, Maoyuan Sun, Francine Chen, Patrick Chiu

[J] How Do Ancestral Traits Shape Family Trees over Generations?, Siwei Fu, Hao Dong, Weiwei Cui, Jian Zhao, Huamin Qu

[J] VIGOR: Interactive Visual Exploration of Graph Query Results, Robert Pienta, Fred Hohman, Alex Endert, Acar Tamersoy, Kevin Roundy, Chris Gates, Shamkant Navathe, Duen Horng Chau

[J] Graphiti: Interactive Specification of Attribute-based Edges for Network Modeling and Visualization, Arjun Srinivasan, Hyunwoo Park, Alex Endert, Rahul C. Basole

Room 301-D

InfoVis Papers

Time and Space

Chair: Benjamin Bach

[J] TACO: Visualizing Changes in Tables Over Time, Christina Niederer, Holger Stitz, Reem Hourieh, Florian Grassinger, Wolfgang Aigner, Marc Streit

[J] CasCADe: A Novel 4D Visualization System for Virtual Construction Planning, Paulo Ivson, Daniel Nascimento, Waldemar Celes, Simone DJ Barbosa

[J] Assessing the Graphical Perception of Time and Speed on 2D + Time Trajectories, Charles Perin, Tiffany Wun, Richard Pusch, Sheelagh Carpendale

[T] Timelines Revisited: A Design Space and Considerations for Expressive Storytelling, Matthew Brehmer, Bongshin Lee, Benjamin Bach, Nathalie Henry Riche, Tamara Munzner

[T] TopKube: A Rank-Aware Data Cube for Real-Time Exploration of Spatiotemporal Data, Fabio Miranda, Lauro Lins, James Klosowski, Cláudio T. Silva

207 Lecture Hall

SciVis Papers

Volume Rendering

Chair: Issei Fujishiro

[J] An Intelligent System Approach for Probabilistic Volume Rendering using Hierarchical 3D Convolutional Sparse Coding, Tran Minh Quan, Junyoung Choi, Haejin Jeong, Won-Ki Jeong

[T] A Statistical Direct Volume Rendering Framework for Visualization of Uncertain Data, Elham Sakhaee, Alireza Entezari

[J] SparseLeap: Efficient Empty Space Skipping for Large-Scale Volume Rendering, Markus Hadwiger, Ali K. Al-Awami, Johanna Beyer, Marco Agus, Hanspeter Pfister

[J] Interactive Dynamic Volume Illumination with Refraction and Caustics, Jens G. Magnus, Stefan Bruckner

[J] A Virtual Reality Visualization Tool for Neuron Tracing, Will Usher, Pavol Klacansky, Frederick Federer, Peer-Timo Bremer, Aaron Knoll, Alessandra Angelucci, Valerio Pascucci

Room 101-ABC

VIS Supporters Presentations

Chair: Allen Sanderson

Tableau, Tableau Research, an industry perspective, Maureen Stone

IBM, Context Analytics as a Catalyst for Insight, Eser Kandogan

VALCRI - Representing and Supporting Analytical Reasoning for the Intelligence Domain, William Wong, *Middlesex University, UK*

Intel, Intel SW Defined Visualization Research, Ingo Wald

6:30–7:30 PM

Room 101-ABC

Bill Ribarsky Memorial

6:30–9:00 PM

Room 301-A

VISAP: Arts Program

Sustain & Decay Exhibition Opening

Installations by: Giorgia Lupi and Accurat; Ozge Samanci; Wonyoung So, Carlo Ratti, Newsha Ghaeli, Xiaojiang Li, and Ian Seiferling; Adriene Jenik; Mauro Martino, Hendrik Strobelt, and Owen Cornec; Scottie Chih-Chieh Huang and Yu-Chun Huang; Philipp Schmitt; Tyler Starr; Clarissa Ribeiro, Mick Lorusso, and Herbert Rocha; Inhye Lee and Hyomin Kim; Pierre Amelot, John Hwong, and Kate McManus

Performances by: Ryan McGee, Jeremy Muller

Demonstrations by: Aseem Agarwal; Pedro Cruz; Jennifer Weiler and Kat Fowler; Kuno Kurzhals and Daniel Weiskopf; Stefan Reinhardt, Markus Huber, and Daniel Weiskopf; Yoon Chung Han; Ben Rydal Shapiro and Francis A. Pearman, II; João Marcos Maciel, Marília Lyra Bergamo, and Judd Bradbury; Manuela Garreton, Karina Hyland, and Denis Parra

WEDNESDAY, 4 OCTOBER

8:30–10:10 AM

Room 301-C

VAST Papers

High-dimensional Data

Chair: Remco Chang

[J] LDSScanner: Exploratory Analysis of Low-Dimensional Structures in High-Dimensional Datasets, Jiazhi Xia, Fenjin Ye, Wei Chen, Yusi Wang, Weifeng Chen, Yuxin Ma, Anthony K.H. Tung

[C] Pattern Trails: Visual Analysis of Pattern Transitions in Subspaces, Dominik Jäckle, Michael Hund, Michael Behrisch, Daniel A. Keim, Tobias Schreck

[J] SkyLens: Visual Analysis of Skyline on Multi-dimensional Data, Xun Zhao, Yanhong Wu, Weiwei Cui, Xinnan Du, Yuan Chen, Yong Wang, Dik Lun Lee, Huamin Qu

[J] Visualizing Big Data Outliers Through Distributed Aggregation, Leland Wilkinson

[T] The Subspace Voyager: Exploring High-Dimensional Data Along a Continuum of Salient 3D Subspaces, Bing Wang, Klaus Mueller

Room 301-D

InfoVis Papers

Perception

Chair: Danielle Albers Szafir

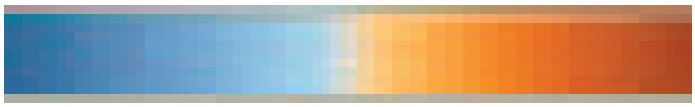
[J] Data Visualization Saliency Model: A Tool for Evaluating Abstract Data Visualizations, Laura E. Matzen, Michael J. Haass, Kristin M. Divis, Zhiyuan Wang, Andrew T. Wilson

[J] Open vs. Closed Shapes: New Perceptual Categories?, David Burlinson, Kalpathi Subramanian, Paula Goolkasian

[T] Perceptual Biases in Font Size as a Data Encoding, Eric Carlson Alexander, Chih-Ching Chang, Mariana Shimabukuro, Steve Franconeri, Christopher Collins, Michael Gleicher

[J] Priming and Anchoring Effects in Visualization, André Calero Valdez, Martina Ziefle, Michael Sedlmair

[T] Evaluating Interactive Graphical Encodings for Data Visualization, Bahador Saket, Arjun Srinivasan, Eric D. Ragan, Alex Endert



207 Lecture Hall

SciVis Papers

Flow Visualization

Chair: Hanqi Guo

[J] Robust Detection and Visualization of Jet-stream Core Lines in Atmospheric Flow, Michael Kern, Tim Hewson, Filip Sadlo, Rüdiger Westermann, Marc Rautenhaus

[T] Visual Analysis of Inclusion Dynamics in Two-Phase Flow, Grzegorz Karch, Fabian Beck, Moritz Ertl, Christian Meister, Kathrin Schulte, Bernhard Weigand, Thomas Ertl, Filip Sadlo

[T] A Combined Eulerian-Lagrangian Data Representation for Large-scale Applications, Franz Sauer, Jinrong Xie, Kwan-Liu Ma

[J] On the Treatment of Field Quantities and Elemental Continuity in FEM Solutions, Ashok Jallepalli, Julia Docampo-Sánchez, Jennifer K. Ryan, Bob Haimes, Robert M. Kirby

Room 101-ABC

VISAP: Arts Program

Session 1

Chair: Jeremy Boy

Paper Presentations:

Adapted Dorling Cartogram on Wage Inequality in Portugal, Pedro Cruz

Understanding People's Interaction with Neural Sci-Art, Manuela Garreton, Karina Hyland, Denis Parra

Visualizing Causes and Effects of California Sea Lion Unusual Mortality Event (UME), Yoon Chung Han, Praful Surve, Subin Kim, Josh Cuellar

Various Artist Talks

10:10–10:30 AM

Coffee Break

10:30 AM–12:10 PM

Room 301-C

VAST Papers

ML1: Deep Learning

Chair: Ross Maciejewski

[J] Analyzing the Training Processes of Deep Generative Models, Mengchen Liu, Jiaxin Shi, Kelei Cao, Jun Zhu, Shixia Liu

[C] Understanding Hidden Memories of Recurrent Neural Networks, Yao Ming, Shaozu CAO, Ruixiang Zhang, Zhen LI, Yuanzhe Chen, Yangqiu Song, Huamin Qu

[J] ActiVis: Visual Exploration of Industry-Scale Deep Neural Network Models, Minsuk Kahng, Pierre Y. Andrews, Aditya Kalro, Duen Horng (Polo) Chau

[J] DeepEyes: Progressive Visual Analytics for Designing Deep Neural Networks, Nicola Pezzotti, Thomas Höllt, Jan van Gemert, Boudewijn P.F. Lelieveldt, Elmar Eisemann, Anna Vilanova

Room 301-D

InfoVis Papers

Design

Chair: Angus Forbes

[J] Scatterplots: Tasks, Data, and Designs, Alper Sarikaya, Michael Gleicher

[J] Considerations for Visualizing Comparison, Michael Gleicher

[J] Structuring Visualization Mock-ups at a Graphical Level by Dividing the Display Space, Romain Vuillemot, Jeremy Boy

[J] [Best Paper Honorable Mention] Bridging From Goals to Tasks with Design Study Analysis Reports, Heidi Lam, Melanie Tory, Tamara Munzner

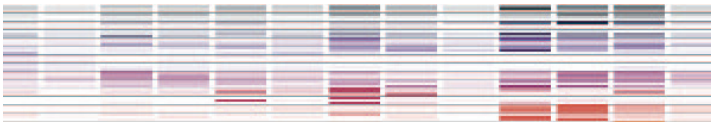
207 Lecture Hall

VAST Papers

Text Analytics

Chair: Patricia Crossno

[T] A Survey on Visual Approaches for Analyzing Scientific Literature and Patents, Paolo Federico, Florian Heimerl, Steffen Koch, Silvia Miksch



[T] vispubdata.org: A Metadata Collection about IEEE Visualization (VIS) Publications, Petra Isenberg, Florian Heimerl, Steffen Koch, Tobias Isenberg, Panpan Xu, Charles Stolper, Michael Sedlmair, Jian Chen, Torsten Möller, John T. Stasko

[J] ConceptVector: Text Visual Analytics via Interactive Lexicon Building using Word Embedding, Deokgun Park, Seungyeon Kim, Jurim Lee, Jaegul Choo, Nicholas Diakopoulos, Niklas Elmqvist

[J] PhenoLines: Phenotype Comparison Visualizations for Disease Subtyping via Topic Models, Michael Glueck, Mahdi Pakdaman Naeini, Finale Doshi-Velez, Fanny Chevalier, Azam Khan, Daniel Wigdor, Michael Brudno

[J] [Best Paper Honorable Mention] Progressive Learning of Topic Modeling Parameters: A Visual Analytics Framework, Mennatallah El-Assady, Rita Sevastjanova, Fabian Sperrle, Daniel A. Keim, Christopher Collins

Room 101-ABC

CG&A Papers

Spatiotemporal Applications

Chair: Francesca Samsel

ARIES: Enabling Visual Exploration and Organization of Art Image Collections, Lhaylla Crissaff, Louisa Wood Ruby, Samantha Deutch, R. Luke DuBois, Jean-Daniel Fekete, Juliana Freire, Cláudio T. Silva

Glyph Visualization: A Fail-Safe Design Scheme Based on Quasi-Hamming Distances, Philip A. Legg, Eamonn Maguire, Simon Walton, Min Chen

StatCast Dashboard: Exploration of Spatiotemporal Baseball Data, Marcos Lage, Jorge Henrique Ono, Daniel Cervone, Justin Chiang, Carlos Dietrich, Cláudio T. Silva

VisAdapt: A Visualization Tool to Support Climate Change Adaptation, Jimmy Johansson, Tomasz Opach, Erik Glaas, Tina-Simone Neset, Carlo Navarra, Bjorn-Ola Linner, Jan Ketil Rod

12:10–2:00 PM

Lunch Break

2:00–3:40 PM

Room 301-C

VAST Papers

Sequences and Events

Chair: Alexander Lex

[J] Sequence Synopsis: Optimize Visual Summary of Temporal Event Data, Yuanzhe Chen, Panpan Xu, Liu Ren

[J] EventThread: Visual Summarization and Stage Analysis of Event Sequence Data, Shunan Guo, Ke Xu, Rongwen Zhao, David Gotz, Hongyuan Zha, Nan Cao

[C] CrystalBall: A Visual Analytic System for Future Event Discovery and Analysis from Social Media Data, Isaac Cho, Ryan Wesslen, Svitlana Volkova, Bill Ribarsky, Wenwen Dou

[C] E-Map: A Visual Analytics Approach for Exploring Significant Event Evolutions in Social Media, Siming Chen, Shuai Chen, Lijing Lin, Xiaoru Yuan, Jie Liang, Xiaolong (Luke) Zhang

[J] Understanding a Sequence of Sequences: Visual Exploration of Categorical States in Lake Sediment Cores, Andrea Unger, Nadine Dräger, Mike Sips, Dirk J. Lehmann

Room 301-D

InfoVis Papers

Multidimensional Data

Chair: Rita Borgo

[J] Exploring Multivariate Event Sequences using Rules, Aggregations, and Selections, Bram C.M. Cappers, Jarke J. van Wijk

[J] Skeleton-based Scagnostics, José Matute, Alexandru C. Telea, Lars Linsen

[T] Keshif: Rapid and Expressive Tabular Data Exploration for Novices, Mehmet Adil Yalcin, Niklas Elmqvist, Benjamin B. Bederson

[J] Visual Exploration of Semantic Relationships in Neural Word Embeddings, Shusen Liu, Peer-Timo Bremer, Jayaraman J. Thiagarajan, Vivek Srikumar, Bei Wang, Yarden Livnat, Valerio Pascucci

[T] Indexed-Points Parallel Coordinates Visualization of Multivariate Correlations, Liang Zhou, Daniel Weiskopf

207 Lecture Hall

SciVis Papers

Topology-based Methods

Chair: Bei Wang

[J] TopoAngler: Interactive Topology-based Extraction of Fishes, Alexander Bock, Harish Doraiswamy, Adam Summers, Cláudio T. Silva

[J] Clique Community Persistence: A Topological Visual Analysis Approach for Complex Networks, Bastian Rieck, Ulderico Fugacci, Jonas Lukasczyk, Heike Leitte

[J] [Best Paper Honorable Mention] The Topology ToolKit, Julien Tierny, Guillaume Favelier, Joshua A. Levine, Charles Gueunet, Michael Michaux

[J] Interactive Design and Visualization of Branched Covering Spaces, Lawrence Roy, Prashant Kumar, Sanaz Golbabaei, Yue Zhang, Eugene Zhang

Room 101-ABC

VIS Panel

Vision Science Meets Visualization

Panelists: Christine Nothelfer, Zoya Bylinskii, Madison Elliott, Cindy Xiong, Danielle Albers Szafir, Ronald Rensink, Todd Horowitz, Steven Franconeri, Karen Schloss, Ruth Rosenholtz

Vision science can explain what people see when looking at visualizations–what data people attend to, what statistics they extract, and what they ultimately remember. This panel features talks from vision scientists who will survey the modern vision science landscape to foster new collaborative opportunities between visualization and vision science.

3:40–4:15 PM

Coffee Break

4:15–5:15 PM

301 D

VIS Fast Forward (Thu & Fri Sessions)

5:15–7:00 PM

Room 301-AB

Posters + Networking + Asynchronous Job Fair

7:00–9:00 PM

Room 301-D

VIS Banquet

THURSDAY, 5 OCTOBER

8:30–10:10 AM

Room 301-C

VAST Papers

Visual Representation and Design Study
Chair: Jinwook Seo

[C] QSAnglyzer: Visual Analytics for Prismatic Analysis of Question Answering System Evaluations, Nan-Chen Chen, Been Kim

[C] A Visual Analytics System for Optimizing Communications in Massively Parallel Applications, Takanori Fujiwara, Preeti Malakar, Khairi Reda, Venkatram Vishwanath, Michael Papka, Kwan-Liu Ma

[C] Visualizing Real-Time Strategy Games: The Example of StarCraft II, Yan-Ting Kuan, Yu-Shuen Wang, Jung-Hong Chuang

[J] A Utility-aware Visual Approach for Anonymizing Multi-attribute Tabular Data, Xumeng Wang, Jia-Kai Chou, Wei Chen, Huihua Guan, Wenlong Chen, Tianyi Lao, Kwan-Liu Ma

[C] The "y" of it Matters: Even for Storyline Visualization, Dustin Arendt, Megan Pirrung

Room 301-D

InfoVis Papers

Text and Machine Learning
Chair: Jaegul Choo

[J] Extracting and Retargeting Color Mappings from Bitmap Images of Visualizations, Jorge Poco, Angela Mayhua, Jeffrey Heer

[J] EdWordle: Consistency-preserving Word Cloud Editing, Yunhai Wang, Xiaowei Chu, Chen Bao, Lifeng Zhu, Oliver Deussen, Baoquan Chen, Michael Sedlmair

[T] An Exploratory Study of Word-Scale Graphics in Data-Rich Text Documents, Pascal Goffin, Jeremy Boy, Wesley Willett, Petra Isenberg

[J] Taking Word Clouds Apart: An Empirical Investigation of the Design Space for Keyword Summaries, Cristian Felix, Enrico Bertini, Steven Franconeri

[J] LSTMVis: A Tool for Visual Analysis of Hidden State Dynamics in Recurrent Neural Networks, Hendrik Strobelt, Sebastian Gehrmann, Hanspeter Pfister, Alexander M. Rush

207 Lecture Hall

SciVis Papers

Visualization in Biology and Medicine
Chair: Tobias Isenberg

[J] Abstractocyte: A Visual Tool for Exploring Nanoscale Astroglial Cells, Haneen Mohammed, Ali K. Al-Awami, Johanna Beyer, Corrado Cali, Pierre Magistretti, Hanspeter Pfister, Markus Hadwiger

[J] [Best Paper Honorable Mention] Instant Construction and Visualization of Crowded Biological Environments, Tobias Klein, Ludovic Autin, Barbora Kozlíková, David S. Goodsell, Arthur Olson, M. Eduard Gröller, Ivan Viola

[J] Decision Graph Embedding for High-Resolution Manometry Diagnosis, Julian Kreiser, Alexander Hann, Eugen Zizer, Timo Ropinski

[J] Visualization Multi-Pipeline for Communicating Biology, Peter Mindek, David Kouřil, Johannes Sorger, Daniel Toloudis, Blair Lyons, Graham Johnson, M. Eduard Gröller, Ivan Viola

Room 101-ABC

VISAP: Arts Program

Session 2
Chair: Angus Forbes

Paper Presentations:
Spatial Reliefs: Cross-Scale Space-Scapes, Clarissa Ribeiro, Mick Lorusso, Herbert Rocha

Fiber Optic Ocean: Merging Media for Data Representation, Ozge Samanci, Adam Snyder

Using the Interaction Geography Slicer to Visualize New York City Stop & Frisk, Ben Rydal Shapiro, Francis A. Pearman, II

3D Visualization of Genetic Networks Using Diverse Art Materials, Jennifer Weiler, Kat Fowler

Various Artist Talks

10:10–10:30 AM

Coffee Break

10:30 AM–12:10 PM

Room: 301-C

VAST Papers

Theory and Analysis Process
Chair: Melanie Tory

[J] Beyond Tasks: An Activity Typology for Visual Analytics, Darren Edge, Nathalie Henry Riche, Jonathan Larson, Christopher White

[C] The Role of Explicit Knowledge: A Conceptual Model of Knowledge-Assisted Visual Analytics, Paolo Federico, Markus Wagner, Alexander Rind, Albert Amor-Amoros, Silvia Miksch, Wolfgang Aigner

[C] Warning, Bias May Occur: A Proposed Approach to Detecting Cognitive Bias in Interactive Visual Analytics, Emily Wall, Leslie Blaha, Lyndsey Franklin, Alex Endert

[C] The Anchoring Effect in Decision-Making with Visual Analytics, Isaac Cho, Ryan Wesslen, Alireza Karduni, Sashank Santhanam, Samira Shaikh, Wenwen Dou

[J] The Interactive Visualization Gap in Initial Exploratory Data Analysis, Andrea Batch, Niklas Elmqvist

Room 301-D

InfoVis Papers

Trees and Table Tennis
Chair: Cagatay Turkay

[J] iTTVis: Interactive Visualization of Table Tennis Data, Yingcai Wu, Ji Lan, Xinhuan Shu, Chenyang Ji, Kejian Zhao, Jiachen Wang, Hui Zhang

[J] Bubble Treemaps for Uncertainty Visualization, Jochen Görtler, Christoph Schulz, Daniel Weiskopf, Oliver Deussen

[J] Stable Treemaps via Local Moves, Max Sondag, Bettina Speckmann, Kevin Verbeek

[J] CyteGuide: Visual Guidance for Hierarchical Single-Cell Analysis, Thomas Höllt, Nicola Pezzotti, Vincent van Unen, Frits Koning, Boudewijn P.F. Lelieveldt, Anna Vilanova

207 Lecture Hall

VIS Panel

How do Recent Machine Learning Advances Impact the Data Visualization Research Agenda?

Panelists: Timo Ropinski (Organizer), Daniel Archambault, Min Chen, Ross Maciejewski, Klaus Mueller, Alexandru Telea, Martin Wattenberg

Nowadays, machine learning approaches have revolutionized many domains. As this pushes the human out of the loop, the human-in-the-loop paradigm might be endangered. Thus, we would like to investigate, which old visualization challenges are rendered obsolete, and which new visualization challenges arise from the recent advances in machine learning.

Room 101-ABC

CG&A Papers

Sports Data Visual Analytics

Chair: Gerik Scheuermann

BKViz: A Basketball Visual Analysis Tool, Antonio G. Losada, Roberto Theron, Alejandro Benito

Director's Cut: Analysis and Annotation of Soccer Matches, Manuel Stein, Halldór Janetzko, Thorsten Breitkreutz, Daniel Seebacher, Tobias Schreck, Michael Grossniklaus, Iain Couzin, Daniel A. Keim

GapChart: a Gap Strategy to Visualize the Temporal Evolution of both Ranks and Scores, Charles Perin, Jeremy Boy, Frederic Vernier

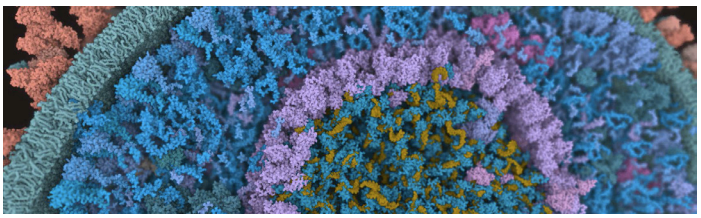
Sport Tournament Predictions by Direct Manipulation, Romain Vuillemot, Charles Perin

12:10–2:00 PM

Lunch Break

Room 101-ABC

VIS 2018 Kick-off Meeting



2:00–3:40 PM

Room 301-C

VAST Papers

Interaction in the Analysis Process

Chair: Alexander Endert

[J] Podium: Ranking Data Using Mixed-Initiative Visual Analytics, Emily Wall, Subhajit Das, Ravish Chawla, Bharath Kalidindi, Eli T. Brown, Alex Endert

[J] Comparing Visual-Interactive Labeling with Active Learning: An Experimental Study, Jürgen Bernard, Marco Hutter, Matthias Zeppelzauer, Dieter Fellner, Michael Sedlmair

[J] Applying Pragmatics Principles for Interaction with Visual Analytics, Enamul Hoque, Vidya Setlur, Melanie Tory, Isaac Dykeman

[J] Understanding the Relationship Between Interactive Optimisation and Visual Analytics in the Context of Prostate Brachytherapy, Jie Liu, Tim Dwyer, Kim Marriott, Jeremy Millar, Annette Haworth

[C] Interactive Visual Alignment of Medieval Text Versions, Stefan Jänicke, David Wrisley

Room 301-D

InfoVis Papers

Understanding Visualization

Chair: Arvind Satyanarayan

[J] Conceptual and Methodological Issues in Evaluating Multidimensional Visualizations for Decision Support, Evanthia Dimara, Anastasia Bezerianos, Pierre Dragicevic

[J] Data Through Others' Eyes: The Impact of Visualizing Others' Expectations on Visualization Interpretation, Yea-Seul Kim, Katharina Reinecke, Jessica Hullman

[J] Active Reading of Visualizations, Jagoda Walny, Samuel Huron, Charles Perin, Tiffany Wun, Richard Pusch, Sheelagh Carpendale

[J] Blinded with Science or Informed by Charts? A Replication Study, Pierre Dragicevic, Yvonne Jansen

[J] The Explanatory Visualization Framework: An Active Learning Framework for Teaching Creative Computing Using Explanatory Visualizations, Jonathan C. Roberts, Panagiotis D. Ritsos, James R. Jackson, Christopher Headleand

207 Lecture Hall

SciVis Contest

Clouds and Atmospheric Processes

Chairs: Amit Chourasia, Thomas Wischgoll

The 2017 IEEE SciVis Contest is dedicated to the visualization and analysis of large and complex atmospheric simulations. The data originates from the HD(CP)² project and shows the weather situation above Germany for April 26, 2013.

Room 101-ABC

VIS Panel

Diversity in Visualization

Panelists: Robert S. Laramee (Organizer), Rita Borgo, Vetria Byrd, Aviva Frank, Kelly Gaither, Ronald Metoyer, Erica Yang

This panel will address the lively topic of diversity in the fields of data visualization and visual analytics from gender, cultural, and technological points of view.

3:40–4:15 PM

Coffee Break

4:15–5:55 PM

Room 301-C

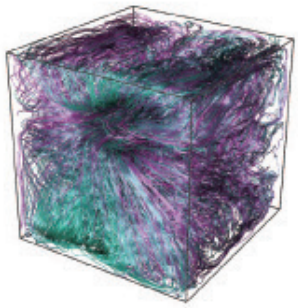
VAST Papers

ML2: Cluster Analysis

Chair: Tatiana von Landesberger

[J] Visualizing Confidence in Cluster-based Ensemble Weather Forecast Analyses, Alexander Kumpf, Bianca Tost, Marlene Baumgart, Michael Riemer, Rüdiger Westermann, Marc Rautenhaus

[J] SOMFlow: Guided Exploratory Cluster Analysis with Self-Organizing Maps and Analytic Provenance, Dominik Sacha, Matthias Kraus, Jürgen Bernard, Michael Behrisch, Tobias Schreck, Yuki Asano, Daniel A. Keim



[J] Towards a Systematic Combination of Dimension Reduction and Clustering in Visual Analytics, John Wenskovitch, Ian Crandell, Naren Ramakrishnan, Leanna House, Scotland Leman, Chris North

[J] Clustervision: Visual Supervision of Unsupervised Clustering, Bum Chul Kwon, Ben Eysenbach, Janu Verma, Kenney Ng, Christopher deFilippi, Walter F. Stewart, Adam Perer

Room 301-D

InfoVis Papers

Graphs and Paths

Chair: Cody Dunne

[J] What Would a Graph Look Like in This Layout? A Machine Learning Approach to Large Graph Visualization, Oh-Hyun Kwon, Tarik Crnovrsanin, Kwan-Liu Ma

[J] Revisiting Stress Majorization as a Unified Framework for Interactive Constrained Graph Visualization, Yunhai Wang, Yanyan Wang, Yingqi Sun, Lifeng Zhu, Kecheng Lu, Chi-Wing Fu, Michael Sedlmair, Oliver Deussen, Baoquan Chen

[J] Functional Decomposition for Bundled Simplification of Trail Sets, Christophe Hurter, Stéphane Puechmorel, Florence Nicol, Alexandru Telea

[J] Orko: Facilitating Multimodal Interaction for Visual Exploration and Analysis of Networks, Arjun Srinivasan, John T. Stasko

[J] HiPiler: Visual Exploration of Large Genome Interaction Matrices with Interactive Small Multiples, Fritz Lekschas, Benjamin Bach, Peter Kerpedjiev, Nils Gehlenborg, Hanspeter Pfister

207 Lecture Hall

VAST Papers

Sensemaking

Chair: Laura McNamara

[T] RCLens: Interactive Rare Category Exploration and Identification, Hanfei Lin, Siyuan Gao, David Gotz, Fan Du, Jingrui He, Nan Cao

[J] EVA: Visual Analytics to Identify Fraudulent Events, Roger A. Leite, Theresia Gschwandtner, Silvia Miksch, Simone Kriglstein, Margit Pohl, Erich Gstrein, Johannes Kuntner

[J] [Best Paper Honorable Mention] Supporting Handoff in Asynchronous Collaborative Sensemaking Using Knowledge-Transfer Graphs, Jian Zhao, Michael Glueck, Petra Isenberg, Fanny Chevalier, Azam Khan

[C] CRICTO: Supporting Sensemaking through Crowdsourced Information Schematization, Haeyong Chung, Sai Prashanth Dasari, Santhosh Nandhakumar, Christopher Andrews

[C] Visual Causality Analysis Made Practical, Jun Wang, Klaus Mueller

Room 101-ABC

VIS Panel

Reflection on Reflection in Design Studies

Panelists: Jason Dykes (Organizer), Miriah Meyer (Organizer), Remco Chang, Uta Hinrichs, Nathalie Henry Riche, Petra Isenberg, Heidi Lam, Tamara Munzner

Design study research methodologies emphasize the need for reflection to generate knowledge. We ask six researchers to reflect upon the role of reflection in design studies, as we try to share and develop good practice. Come along to participate in an interactive conversation around reflection, that underpins applied visualization research.

Room 103-A

VISKids & VISAP Session

Dear Data Studio with Giorgia Lupi

VISKids and VISAP jointly present a special event with the VIS capstone speaker Giorgia Lupi, an award winning information designer who co-founded and is design director of the data-driven design firm Accurat. Giorgia is co-author of "Dear Data", an inspirational hand drawn data visualization book. She brings the spirit of this book to VIS in a live participatory visualization session. The audience will be asked to manually visualize data (draw!) following the visual language of different abstract paintings. Giorgia will guide participants through the process. VISKids are welcome to attend.

DOCTORAL COLLOQUIUM 2018
Call for Participation

VIS 2018 will host a Doctoral Colloquium to support the next generation of visualization researchers. 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. While all students are invited to apply, priority will be given to those who will gain the most from the experience. Typically, this means students who will be preparing or completing their dissertation proposals near the time of the Colloquium.

Questions? Email doctoral_coll@ieeevis.org

8:30–10:10 AM

Room 102-ABC

VAST Papers

ML3: Classification

Chair: Huamin Qu

[J] Do Convolutional Neural Networks Learn Class Hierarchy? Bilal Alsallakh, Amin Jourabloo, Mao Ye, Xiaoming Liu, Liu Ren

[J] Visual Diagnosis of Tree Boosting Methods, Shixia Liu, Jiannan Xiao, Junlin Liu, Xiting Wang, Jing Wu, Jun Zhu

[C] A Workflow for Visual Diagnostics of Binary Classifiers using Instance-Level Explanations, Josua Krause, Aritra Dasgupta, Jordan Swartz, Yindalon Aphinyanaphongs, Enrico Bertini

[J] TreePOD: Sensitivity-Aware Selection of Pareto-Optimal Decision Trees, Thomas Mühlbacher, Lorenz Linhardt, Torsten Möller, Harald Piringer

Room 105-ABC

InfoVis Papers

Evaluation

Chair: Lane Harrison

[J] Imagining Replications: Graphical Prediction & Discrete Visualizations Improve Recall & Estimation of Effect Uncertainty, Jessica Hullman, Matthew Kay, Yea-Seul Kim, Samana Shrestha

[T] A Systematic Review of Experimental Studies on Data Glyphs, Johannes Fuchs, Petra Isenberg, Anastasia Bezerianos, Daniel A. Keim

[J] The Hologram in My Hand: How Effective is Interactive Exploration of 3D Visualizations in Immersive Tangible Augmented Reality? Benjamin Bach, Ronell Sicat, Johanna Beyer, Maxime Cordeil, Hanspeter Pfister

[T] Evaluating Cartogram Effectiveness, Sabrina Nusrat, Muhammad Jawaherul Alam, Stephen Kobourov

[J] [Best Paper Honorable Mention] Keeping Multiple Views Consistent: Constraints, Validations, and Exceptions in Visualization Authoring, Zening Qu, Jessica Hullman

Room 106-ABC

SciVis Papers

Applications and Visual Analysis

Chair: Torsten Möller

[J] Multiscale Visualization and Scale-Adaptive Modification of DNA Nanostructures, Haichao Miao, Elisa De Llano, Johannes Sorger, Yasaman Ahmadi, Tadija Kekic, Tobias Isenberg, M. Eduard Gröller, Ivan Barišic, Ivan Viola

[T] DSPCP: A Data Scalable Approach for Identifying Relationships in Parallel Coordinates, Hoa Nguyen, Paul Rosen

[T] PETMiner – A Visual Analysis Tool for Petrophysical Properties of Core Sample Data, Dave G. Harrison, Nick D. Efford, Quentin J. Fisher, Roy A. Ruddle

[J] StreetVizor: Visual Exploration of Human-Scale Urban Forms Based on Street Views, Qiaomu Shen, Wei Zeng, Yu Ye, Stefan Müller Arisona, Simon Schubiger, Remo Burkhard, Huamin Qu

[J] BASTet: Shareable and Reproducible Analysis and Visualization of Mass spectrometry Imaging Data via OpenMSI, Oliver Rübel, Benjamin P. Bowen

Room 101-ABC

VIS Panel

A Matter of Scale - Scale Matters

Panelists: Arthur Olson (Organizer), Eduard Gröller (Organizer), Alan M. MacEachren, Todd Richmond, Cláudio T. Silva

Scale and scalability have been recurring topics in our field. Recent developments like smart data, machine learning, and advances in domains like biology, cartography, smart communities, and communication pose novel challenges to scalability and use of scale. Examples include support for scale-transparent visual computing, cross-scale visualization and interaction, massive multi-scale techniques, scale integration, cross-scale labeling and annotation, cross scales on structure and dynamics, and continuous scales.

10:10–10:30 AM

Coffee Break
(Note: This break takes place outside of the *Grand Hyatt Ballroom*)

10:30–11:30 AM

Phoenix Grand Hyatt Ballroom ABCD

VIS Capstone

Speaker: Giorgia Lupi, *Accurat*

Data Humanism - The Revolution will be Visualized

Please see p.4 for Capstone details.

Note: This session takes place in Grand Hyatt Ballroom

11:30–11:45 AM

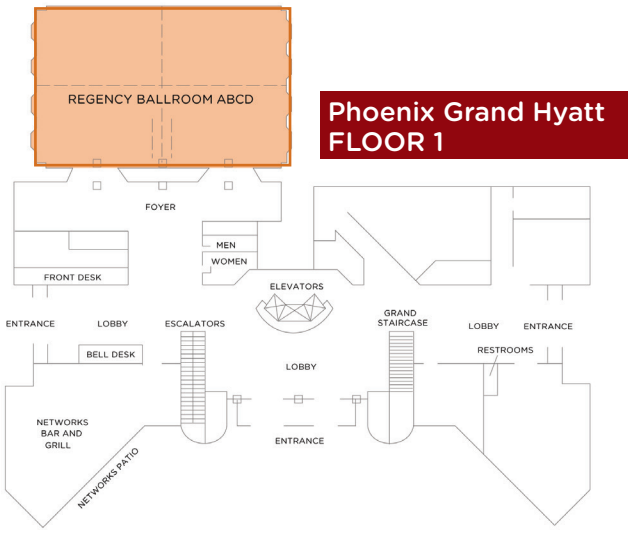
Phoenix Grand Hyatt Ballroom ABCD

VIS Closing

VIS 2017 General Chair: James Ahrens, *Los Alamos National Laboratory*

VIS 2018 General Chair: Holger Theisel, *University of Magdeburg*

Note: This session takes place in Grand Hyatt Ballroom



Recommended for Practitioners

POSTERS & CONTESTS

VAST Posters

3D Exploration of Graph Layers via Vertex Cloning, James Abello, Fred Hohman, Duen Horng Chau

[VAST Honorable Mention] **DSMVis: Interactive Visual Exploration of the DSM-5 for Mental HealthProviders,** Ji Won Chung, Isha Raut, Ji Young Yun, Kelly Pien, Subshini Sridhar, Morganne Crouser, R. Jordan Crouser

Visualizing Meta-Explanations in Early Intervention Systems for Police Departments, Damon Crockett, Joe Walsh, Klaus Ackermann, Andrea Navarrete, Rayid Ghani

TrajectoryFlow: Visual Summarization of Temporal Sequences, Filip Dabek, Jian Chen, Jesus Caban

Interactive Temporal Feature Construction: A User-Driven Approach to Predictive Model Development, David Gotz, Rashnil Chaturvedi

Visual Exploration of Word Vector Embeddings, Florian Heimerl, Michael Gleicher

Exploring Entity Behavior on the Bitcoin Blockchain, Petra Isenberg, Christoph Kinkeldey, Jean-Daniel Fekete

High-Recall Document Retrieval from Large-Scale Noisy Documents via Visual Analytics based on Targeted Topic Modeling, Hannah Kim, Jaegul Choo, Alex Endert, Haesun Park

eDOI: Exploratory Degree of Interest, Visual User Interest Based Exploration of Multilayer Networks, Antoine Laumond, Bruno Pinaud, Guy Melancon

Combining 2D Graph & 3D Visualization for Neuron Connectivity Analysis, Ching-Yao Lin, Kuen-Long Tsai, Hsiu-Ming Chang, Ann-Shyn Chiang

Applying Multi-Player Rating Schemes to Manage User Studies of Visual Analytics Designs, Salman Mahmood, Klaus Mueller

Improving Financial Decision Making by Updating Multivariate Data Representation in Candlestick Charts, Caitlyn McColeman, Mark Blair

ProvThreads: Analytic Provenance Visualization and Segmentation, Sina Mohseni, Eric Ragan, Alyssa M. Pena

A Study of Algorithms for Detecting Community in Networks, Vinh Nguyen, Tuan Dang

PredVis - Interaction Techniques for Time Series Prediction, Sakshi Sanjay Pratap, Alex Endert

[VAST Best Poster] **Provenance-Based Visualization Retrieval,** Holger Stitz, Samuel Gratzl, Harald Piringer, Marc Streit

iSPM - An Interactive Scatterplot Matrix for Visualizing Multidimensional Engineering Data, Tomoaki Tatsukawa, Akira Oyama, Takehisa Kohira, Hiromasa Kemmotsu, Hideo Miyachi

ECGLens : Interactive ECG Classification and Exploration, Jun Yuan, Siyao Fang, Xiang Huang, Nan Cao

Visualization System for Anomaly Detection for Data Acquisition Systems, Fan Zhao, TongHai Jiang, Li Cheng

InfoVis Posters

On the Use of Parallel Coordinates for Temporal Multivariate Data, Kahin Akram Hassan, Jimmy Johansson, Camilla Forsell, Matthew Cooper, Niklas Rönnberg

Toward an Understanding of Observational Advantages in Information Visualization, Ali Baigelenov, Michael Saenz, Ya-Hsin Hung, Paul Parsons

A Proposal for Measuring the Perceived Pairwise Similarity Inspired by Tversky's Similarity Model on the Example of Directed Acyclic Graphs, Kathrin Ballweg, Margit Pohl, Guenter Wallner, Tatiana von Landesberger

Culturally Meaningful Glyphs Contain Information About Data as Elucidated Through a Stroop Task, Chris Bartlett, Brett Klamer, Annalisa Hartlaub, William Ray

Reflections on Working With Fellow Tool Builders, Alex Bigelow

PhysVis: A Data Physicalization Pipeline Enhanced With Augmented Reality, Doğacan Bilgili, Selim Balcisoy

Demonstrating the Value of Visualization: Highlights from the 2017 PacificVis Visual Data Storytelling Contest, Matthew Brehmer, Kyungwon Lee, Ivan Viola, Jinwook Seo, Bongshin Lee

Showcasing the Design Study Methodology Through Simpler Design Challenges: An Application to a Microbial Genomics Clinical Report Design, Anamaria Crisan, Geoffrey McKee, Tamara Munzner, Jennifer L. Gardy

Visualizing Hierarchical Time Series with a Focus+Context Approach, Erick Cuenca, Arnaud Sallaberry, Florence Ying Wang, Pascal Poncelet

CricVis: Interactive Visual Exploration and Analysis of Cricket Matches, Ayan Das, Arjun Srinivasan, John Stasko

DimReader: Using Auto-differentiation to Explain Non-linear Projections, Rebecca Faust, Carlos Scheidegger

The Impact of Text-based Search in Interactive Data Visualizations on the Web, Mi Feng, Cheng Deng, Evan Peck, Lane Harrison

Exploring Shared Immersive Visualization in AR, Juliano Franz, Joseph Malloch, Derek Reilly

Taggle: Scaling Table Visualization through Aggregation, Katarína Furmanová, Miroslava Jarešová, Bikram Kawan, Holger Stitz, Martin Ennemoser, Samuel Gratzl, Alexander Lex, Marc Streit

Plotting Eye Tracking Data in Space-Time Cubes, Nathan Garrett

Visualization of Multivariate Data with Network Constraints using Multi-Objective Optimization, Bhavya Ghai, Alok Mishra, Klaus Mueller

Introducing the Packed Bars Chart Type, Xan Gregg

Nutrition Bytes: Visualizing Food Content, Shuai He, Daniel Kerrigan, Ronald Metoyer

Particulates Matter: Assessing Needs for Air Quality Visualization, Aspen Hopkins, Pascal Goffin, Miriah Meyer

Improving Value Driver Trees to Enhance Business Data Analysis, Tom Horak, Ulrike Kister, Raimund Dachselt

InfoNice: Easy Customization of Information Graphics, He Huang, Yun Wang, Haidong Zhang, Qiufeng YIN, Zhitao Hou, Dongmei Zhang

Evaluating User Engagement in Information Visualization Using Mixed Methods, Ya-Hsin Hung, Paul Parsons

Exploring Hidden Dimensions of the Rijksmuseum, John Hwong, Pierre Amelot, Kathryn McManus, Adam Perer

VisSurvey.js - A Web Based Javascript Application for visualisation Evaluation User Studies, James Jackson, Jonathan Roberts

Visualizing the Scholarly Output of a Research Facility, Bharat Kale, Michael Papka

Viziometrics: Identifying Central Figures in Scientific Papers, Olga Kazakova, Po-Shen Lee, Jevin West, Bill Howe

Visualizing Shared Fans Between Sports Teams, Tanyoung Kim

Design Methods in Data Visualization and Elsewhere: Towards Aiding Novice Designers, Houda Lamqaddam, Jan Aerts

SynMapN: Interactive Visual Comparison for Multiple Genomes, Mingwei Li, Andreina Siri, Asher Haug-Baltzell, Eric Lyons, Carlos Scheidegger

Exploring Simulation Scenarios with Timepoint Thumbnails, Aran Lunzer

Linking Performance on Graphical Perception tasks to Visualization Literacy, Hamid Mansoor, Kartik Vasu, Lane Harrison

Ray labeling: dynamic directional labeling for compact term hierarchies, Nicolas Médoc, Colas Picard, Benoît Otjacques, Mohammad Ghoniem

DataTours: A Data Narratives Framework, Hrim Mehta, Amira Chalbi, Fanny Chevalier, Christopher Collins

Visualizing A Walk Through the Random Forest, Samuel Meyer, Yiyi Chen, Marti Hearst

CancerMapper: Explorations of Cancer Study Network, Vinh Nguyen, Tuan Dang

Lineage: Visualizing Multivariate Clinical Data in Genealogy Graphs, Carolina Nobre, Nils Gehlenborg, Hilary Coon, Alexander Lex

Ranking encodings for efficient perceptual processing of data relations, Christine Nothelfer, Steven Franconeri

Juxtaposition of hierarchical quantities with bipartite Krona charts, Brian Ondov, Adam Phillippy

The Symmetry of My Life: An Autobiographical Visualization, Charles Perin

Viseract: Computer Vision based Gesture Control for InfoVis, Sakshi Sanjay Pratap, Dhruv Chand Muttaraju

Hue Bands and Human Perception: Revisiting the Rainbow, P. Samuel Quinan, Lace Padilla, Sarah Creem-Regehr, Miriah Meyer

Web-based Immersive Analytics in Handheld Augmented Reality, Panagiotis Ritsos, James Jackson, Jonathan Roberts

Visualisation and Graphical Techniques to Help Writers Write More Idiomatically, Jonathan Roberts, Ana Frankenberg-Garcia, Robert Lew, Geraint Rees, Javier Pereda

Sonification Enhances Perception of Color Intensity, Niklas Rönnberg

[InfoVis Best Poster] **Dynamic Design Documents for supporting applied visualization,** Chris Rooney, Roger Beecham, Jason Dykes, William Wong

Approximate Entropy as a Measure of Line Chart Complexity, Gabriel Ryan, Abigail Mosca, Eugene Wu, Remco Chang

Real-time Visual Recap and Game-flow Visualization, Felipe Sarmiento, Hemanth Pidaparthy, Peter Coppin

Toward a General Animated Transition Framework, Sierra Shell, Lisa Everdyke, Joseph Hines, Shaun Kurian, Rajiv Ramarajan, Sunny Su, Jordan Benson

Abbreviating Text Labels on Demand, Mariana Shimabukuro, Christopher Collins

Atomic Operations for Specifying Graph Visualization Techniques, Charles D. Stolper, Will Price, Matt Sanford, Duen Horng Chau, John Stasko

Driving Interactive Graph Exploration Using 0-Dimensional Persistent Homology Features, Ashley Suh, Mustafa Hajij, Bei Wang, Carlos Scheidegger, Paul Rosen

TopoCubes: Interactive Exploration of Persistence Homology of Large Datasets, Zhe Wang, Paul Rosen, Bei Wang, Carlos Scheidegger

Design for Transfer Time Criticality in Plans of Uncertain Train Trips, Marcel Wunderlich, Tatiana von Landesberger, Volker Knauthe

[InfoVis Honorable Mention] **The Curse of Knowledge in Visual Data Communication,** Cindy Xiong, Lisanne van Weelden, Steven Franconeri

Equity Monitor: Visualizing Attributes of Health Inequity in Atlanta, Xiaoxue Zhang, Alex Godwin, John Stasko

VisPod: A Visual Audio Player for Content Exploration, Qiyu Zhi, Shuai He, Ronald Metoyer

SciVis Posters

[SciVis Honorable Mention] **Correlation Study on Attributes of Unsteady Flows,** Marzieh Berenjkoub, Lei Zhang, Guoning Chen

Visualizing Clustering and Uncertainty Analysis with Multivariate Longitudinal Data, Maximillian Chen, Kristin Divis, Laura McNamara, Dan Morrow

Comparative Visualizations of Noisy and Filtered Blood Flow from 4D PC-MRI Cardiac Datasets, Fahim Hasan Khan, Allan Rocha, Usman Alim

Intuitive Transfer Function Editing Using Relative Visibility Histograms, Shengzhou Luo, John Dingliana

From Visualization to Visual Analytics for Environmental Science, Taylor Mutch, Nikolas Stevenson-Molnar, Judith Bayard Cushing, Chad Zanocco, Mike Bailey, Genevieve Orr, Peter Drake, Denise Lach

Visualization and Analysis of Human Effective Connectivity using Convergent Cross Mapping, Hiroaki Natsukawa, Koji Koyamada

[SciVis Best Poster] **Edit Distances for Comparing Merge Trees,** Raghavendra Sridharamurthy, Adhitya Kamakshidasan, Vijay Natarajan

Augmenting Tactile 3D Data Exploration With Pressure Sensing, Xiyao Wang, Lonni Besançon, Mehdi Ammi, Tobias Isenberg

Exploration and Comparison of Trajectory Data, Johannes Waschke, Mario Hlawitschka

Using Visualization To Understand Earthquake Simulation Data, Zhenge Zhao, Youhao Wei, Joshua Levine, Matthew Berger, Danilo Motta, Carlos Scheidegger

Doctoral Colloquium

Panelists

Hank Childs, Kelly Gaither, Tatiana von Landesberger, Torsten Möller, Ken Moreland, Jonathan C. Roberts, Marc Streit, Michael Sedlmair, Nathalie Henry Riche

Session 1

Improving Visual Investigation Analysis of Digital Communication Data within E-discovery, Mithileysh Sathiyanarayanan, *City, University of London, United Kingdom*

Centrality Based Visualization Methods for Abstract Data, Mukund Raj, *University of Utah, USA*

Visualising Geographically-Embedded Flow Data, Yalong Yang, *Monash University, Australia*

Session 2

Harnessing Cognitive Bias in Mixed Initiative Visual Analytics, Emily Wall, *Georgia Tech, USA*

Guidance Methods for the Visual Analytics of Time and Time-oriented Data, Davide Ceneda, *Vienna University of Technology, Austria*

Visualization by Demonstration, Bahador Saket, *Georgia Tech, USA*

Supporting Exploration and Engagement in Interactive Visualizations, Mi Feng, *Worcester Polytechnic Institute, USA*

Optimizing Visualization Performance on Power-Constrained Supercomputers, Stephanie Labasan, *University of Oregon, USA*

Tightly vs. Loosely Coupled In Situ: Which Technique to Use at Scale?, James Kress, *University of Oregon, USA*

Session 3

Sketching Mental Maps of Urban Spaces for the Visual Analysis of Spatial Data, Alex Godwin, *Georgia Tech, USA*

Contextual Similarity Abstraction Techniques for Spatial Data Analysis, Timothy Luciani, *University of Illinois at Chicago, USA*

VisFlow - Web-based Data Flow Framework for Visual Data Exploration, Bowen Yu, *New York University, USA*

Methods and Optimizations for Big Data Exploratory Visualization Systems, Marianne Procopio, *Tufts University, USA*

Volume Visualization Using Line Integral Convolution for Large Scale Vector Field, Yangguang Liao, *University of California at Davis, USA*

Tracking Space-Filling Structures in Turbulent Flows, Andrea Schnorr, *RWTH Aachen University, Germany*

Session 4

Towards User-Adaptive Visualizations in Multi-Modal Documents, Dereck Toker, *University of British Columbia, Canada*

Visual Causality Analysis, Jun Wang, *Stony Brook University, USA*

Visualization of Multivariate Data on Surfaces, Allan Rocha, *University of Calgary, Canada*

VAST Challenge

VAST Challenge 2017: Mystery at the Wildlife Preserve, Mark A. Whiting, Kris Cook, R. Jordan Crouser, John Fallon, Georges Grinstein, Jereme Haack, Cindy Henderson, Kristen Liggett, Diane Staheli, Jana Strasburg, Jerry Tagestad, Carrie Varley

[Multi-Challenge Award: Aesthetic Design] **ClockPetals: Interactive Sequential Analysis of Traffic Patterns,** Hui Tang, Wenjie Wu, Zheng Zhou, Sijin Wang, Aijun Huang, Yafeng Niu, Yingjie Victor Chen, Zhenyu Cheryl Qian

[Multi-Challenge Award: Aesthetic Design] **WindNebula: Vectorial-Temporal Analysis for Environmental Assessment,** Hui Tang, Wenjie Wu, Zheng Zhou, Sijin Wang, Aijun Huang, Yafeng Niu, Yingjie Victor Chen, Zhenyu Cheryl Qian

[Multi-Challenge Award: Compelling Synthesis of Information] **PreserVis, a Visual Analytic System for Traffic and Pollution Patterns,** Lian Chen, Qiao Gu, Haotian Li, Chengzhong Liu, Huamin Qu, Hang Yin, Xuanwu Yue

[Multi-Challenge Award for Clear Presentation of Hypotheses and Supporting Evidence] **Spatiotemporal Identification of Anomalies in a Wildlife Preserve,** Jason Ong Guan Jie, Kishan Bharadwaj Shridhar, Yanrong Zhang, Kam Tin Seong

[Multi-Challenge Award: Combining Automated and Visual Analytics] **Interactive and Collaborative Visual Analysis on Traffic Sensor Data,** Xi Chen, Lu Feng, Yang Hu, Chufan Lai, Qiangqiang Liu, Pengju Teng, Zhanyi Wang, Xiaoru Yuan, Chenglei Yue

[Multi-Challenge Award: Combining Automated and Visual Analytics] **Temporal Pattern Analysis and Source Detection through Visual Analysis on Multi-Dimensional Time Series Data,** Hong Fan, Wei Huang, Ruike Jiang, Nan Ma, Xiaoru Yuan, Ying Zhao

[Multi-Challenge Award: Combining Automated and Visual Analytics] **Visual Analysis for Multi-Spectral Images Comparisons,** Shuai Chen, Zhibang Jiang, Guozheng Li, Qiusheng Li, Qiangqiang Liu, Xi Liu, Yuening Shi, Xiaoru Yuan

[Mini-Challenge 1 Award: Elegant Support for Hypothesis Generation and Testing] **Exploring Lekagul Sensor Events using Rules, Aggregations, and Selections,** Bram C.M. Cappers

[Mini-Challenge 1 Award: Actionable and Detailed Analysis] **Interactive Visual Analytics Application for Spatiotemporal Movement Data,** Guan Yifei, Kam Tin Seong,

[Mini-Challenge 1 Award: Outstanding Clarity of the Presentation] **Mystery at Legakul Preserve: The Pipits Kick It,** Jordan Riley Benson, Nascif Abousalh-Neto, Jon Nemargut, Rajiv Ramarajan

[Mini-Challenge 1 Award: Excellence in Spatio-Temporal Graph Analytics] **ODIX: A Rapid Hypotheses Testing System for Origin-Destination Data,** Juri Buchmüller, Wolfgang Jentner, Dirk Streeb

[Mini-Challenge 1 Honorable Mention: Novel Use of Experimental Coordinated Visualizations] **A Visual Explorer for Analyzing Trajectory Patterns,** Wooil Kim, Yon Dohn Chung, Changbeom Shim, Ilhyun Suh

[Mini-Challenge 2 Award: Comprehensive Mini-Challenge 2 Solution] **Visual Analytic Design for Detecting Airborne Pollution Sources,** Jo Wood

[Mini-Challenge 2 Honorable Mention: Clarity in Visual Communication] **Mining Factory Pollution Data through a Spatial-Nonspatial Flow Approach,** Joshua Castor, Joseph Borowicz, Andrew Burks, Manu Thomas, Timothy Luciani, G.E. Marai

[Mini-Challenge 3 Honorable Mention: Good Facilitation of Single Image Analysis] **Multi-Spectral Satellite Image Analysis for Feature Identification and Change Detection,** Sulav Malla, Anwesh Tuladhar, Ghulam Jilani Quadri, Paul Rosen

[Mini-Challenge 3 Honorable Mention: Good Interactive Image Explorer for Temporal Analysis] **A Web-Based Interactive Image Explorer for Temporal Analysis of Satellite Images,** Bartosz Kupiec, Vijayraj Mahida, Timothy Luciani, Andrew Burks, G.E. Marai

Detecting Vehicular Patterns Using a Graph-Based App, Sirisha Velampalli, Lenin Mookiah, William Eberle

Visual Analysis to Explore Mystery at Wildlife Preserve, Bo Sun, Rumeel Jessamy, Sungsoo Ha, Wei Xu

Multi-Spectral Satellite Image Analysis for Feature Identification and Change Detection, Sulav Malla, Anwesh Tuladhar, Ghulam Jilani, Quadri, Paul Rosen

iDVL Visualizes Patterns of Traffic, Long Nguyen, Tommy Dang

Temporal and Spatial Analysis of VAST 2017's Mini-Challenge 1, Chris Muller, Kevin McGurgan, Stephanie Kane

Visual Analytic Design for Characterizing Air-Sampling Sensor Performance and Operation, Ghulam Jilani Quadri, Anwesh Tuladhar, Sulav Malla, Paul Rosen

SIZE: Satellite Image Zooming and Exploration, Udo Schlegel, Alexandra Diehl, Daniel A. Keim

VAST Mini-Challenge 1, Ayushi Gupta, Veera Raghavendra Chikka, Kamalakar Karlapalem

Multilab: Multispectral Image Analysis in Matlab, Tim McGraw, Aijun Huang, Sijin Wang

Visual Integration of Meteorological and Sensor Data for Identifying Suspicious Company Behavior, Daniel Seebacher, Bruno Schneider, Michael Behrisch

MC1 — Iterative Analysis of Spatio-temporal Data by Textual Queries and Visualizations, Michael Beham, Silvana Podaras, Rainer Splechtna, Denis Gracanin, Kresimir Matkovic

MC2 — Spatio-Temporal Provenance Data Aggregation for Visual Analysis, Rainer Splechtna, Silvana Podaras, Michael Beham, Denis Gracanin, Kresimir Matkovic

MC3 — Modified Frame Differencing of Satellite Images to Detect Temporal Changes in a Natural Preserve, Michael Beham, Rainer Splechtna, Silvana Podaras, Denis Gracanin, Kresimir Matkovic

GC — Holistic Analysis of Heterogeneous Datasets, Silvana Podaras, Michael Beham, Rainer Splechtna, Denis Gracanin, Kresimir Matkovic

MC1: A Bespoke Analysis Tool for Spatio-temporal Park Traffic Data, Dimitar Kirilov, Isabel Lindmae, Andrew Burks, Chihua Ma, G.Elisabeta Marai

Interactive Visual Analysis of Traffic Patterns: Ecological Impact within a Nature Preserve, Allison Montroy, Tyler Witter, Christopher Banas, Walter Bennette

Data Aggregation and Visualization Technique for Traffic Sensor Data, Anwesh Tuladhar, Sulav Malla, Ghulam Jilani Quadri, Paul Rosen

Visualizing Chemicals Detection, Jiaqi Zhang, Xintian Liu, Hongjun Qian, Tin Seong Kam

Uncovering the Mistford Toxic Conspiracy, Dirk Streeb,Juri Buchmuller, Udo Schlegel, Wolfgang Jentner, Michael Behrisch, Bruno Schneider, Daniel Seebacher

Visual Statistical Analysis of Environmental Sensor Data, Bindu Gupta, Kaushal Paneri, Gunjan Sehgal, Karamjit Singh, Geetika Sharma, Gautam Shroffk

Visual Analysis for Wildlife Preserve based on Multi-systems, Lijing Lin, Min Lu, Guozheng Li, Shuai Chen, Chufan Lai, Ruike Jiang, Qiangqiang Liu, Xiaoru Yuan

VAST Challenge 2017: Mini-challenge 1, Shu Zhang, Danhuai Guo, Yingqiu Zhu, Deqiang Wang

SciVis Contest

[Invited presentation] **Looking into Clouds: Data Analysis and Visualization in Climate Science,** Ksenia Gorges, Niklas Röber

[Contest Winner] **Visualization of Clouds and Atmospheric Air Flows,** Noel Rimensberger, Markus Gross, Tobias Günther

[Contest Honorable Mention] **STRIELAD - A Scalable Toolkit for Real-time Interactive Exploration of Large Atmospheric Datasets,** Simon Schneegans, Lori Neary, Markus Flatkn, Andreas Gerndt

Visualization of Weather Simulation Data Using Tecplot 360, Devon Simpson, Jerimiah Lee, Craig Mackey, Chris Idso

SciVis Contest 2017: Visualization of a Large Climate Dataset, Alireza Amiraghdam, Matthias Thöny, Renato Pajarola

Preview of 2018 SciVis Contest, John Patchett

LDAV Posters

An Application-Oriented Framework for Feature Tracking in Atmospheric Sciences, Daisuke Sakurai, Hans-Christian Hege, Alex Kuhn, Henning Rust, Bastian Kern, Tom-Lukas Breitkopf

Optimal Viewpoint Finding for Space Time Cube to Explore Spatio-temporal Characteristics of Vehicle Trajectories on Crossroads, Masahiko Itoh, Daisaku Yokoyama, Masashi Toyoda, Masaru Kitsuregawa

Virtual Reality Tools for the Correction of Automated Volume Segmentation Errors using Dense Surface Reconstructions, Edouard Brooks, Joseph Insley, MIchael Papka, Silvio Rizzi

VizSec Posters

A Survey of Technical Approaches for Developing, Deploying, and Adopting Visualizations in the Cybersecurity Domain, Robert Gove

Exploration of User Centered and System Based Approaches to Cyber Situation Awareness, Margaret Varga, Carsten Winkelholz, Susan Traeber-Burdin

Exploring the Design Space for Cyber Alerts in Context, Michelle Dowling, Lyndsey Franklin, Mi Feng, Meg Pirrung, Robert Jasper, Joseph Cottam, Leslie Blaha

BiG2-KAMAS: Supporting Knowledge-Assisted Malware Analysis with Bi-Gram Based Valuation, Niklas Thür, Markus Wagner, Johannes Schick, Christina Niederer, Jürgen Eckel, Robert Luh, Wolfgang Aigner

Towards a Common Evaluation Framework for Cyber Security Visualizations, Noëlle Rakotondravony, Hans P. Reiser

Supporting Knowledge-assisted Rule Creation in a Behavior-based Malware Analysis Prototype, Johannes Schick, Niklas Thür, Christina Niederer, Gernot Rottermanner, Paul Tavolato, Wolfgang Aigner, Markus Wagner

VAHC Posters

Interactive Visualization of Functional Aspects in Head and Neck Cancer Aftercare, Juliane Müller, Veit Zebralla, Susanne Wiegand, Steffen Oeltze-Jafra

Visualizing Completeness Uncertainty to Support Medical Data Exploration and Analysis, Ali Sarvghad Batn Moghaddam, Sanjay Mahta, Davey Smith, Nadir Weibel

MedStory: Unlocking the Qualitative Power of Medical Narratives, Nicole Sultanum, Patricia Thaine, Michael Glueck, Michael Brudno, Daniel Wigdor, Fanny Chevalier

Exploring Health Awareness in the Middle East by Visual Slice and Dice of Facebook Data, Michael Aupetit, Matheus Araujo, Yelena Mejova, Ingmar Weber

Exploring Interactive Visualizations of Patient-Specific Problem Mixtures, Gal Levy-Fix, Noemie Elhadad

Collaborative Design of Visual Analytic Techniques for Survey Data for Community-based Research in Public Health, Jaya Sreevalsan-Nair, Nirmala Murthy, Shivam Agarwal, Reddy Rani Vangimalla, Sanat Ramesh

Vis In Practice Papers

LiveVis: Visualizing Results of Second Screen Surveys in Real Time at TV Stages, Kerstin Blumenstein, Bianca Leitner, Niklas Thür, Armin Kirchknopf, Markus Seidl, Wolfgang Aigner

SeedMe: Stream Encode Explore and Disseminate My Experiments, Amit Chourasia, David Nadeau, Mona Wong, Dmitry Mishin, Michael Norman

Belle2VR – A Virtual Reality Visualization of Subatomic Particle Physics, Zach Duer, Leo Piilonent, George Glasson

Towards Formalization of View-Driven Development Processes, Adrian Hernandez-Mendez, Anne Faber, Manoj Bhat, Florian Matthes

Analyzing Climate Simulation Ensembles Using Pareto Sets, Lars Huettenberger, Kathrin Feige, Michael Böttinger, Christoph Garth

Scholars@Cornell: Visualizing the Scholarship Data, Muhammad Javed, Sandy Payette

Dealing with Sparse Domain Information - Visualization Practice Lessons, Benjamin Karer, Alina Freund, Michael Horst, Inga Scheler, Hans Hagen

Delivery of In Situ Capability to End Users, John Patchett, Boonthanome Nouanesengsy, James Ahrens, Michael Lang, David Rogers, Jennifer Green, Francesca Samsel, Giovanni Cone, Hans Hagen

Requirements Analysis & Concepts for Future European Air Traffic Control Systems, Gernot Rottermanner, Markus Wagner, Volker Settgast, Volker Grantz, Michael Iber, Ursula Kriegshaber, Wolfgang Aigner, Peter Judmaier, Eva Eggeling

Visual Analytics Ecology for Complex System Testing, Simon Su, Michael Barton, Michael An, Vincent Perry, Chen Li, Jianfeng Jia, Brian Panneton

Activelec: A n Interaction-Based Visualization System to Analyze Household Electricity Consumption, Jérémy Wambecke, Georges-Pierre Bonneau, Renaud Blanch, Romain Vergne

Spatiotemporal Driven Analysis of Law Enforcement Data, Guizhen Wang, Aubrey Akers, Jose Florencio de Queiroz Neto, Chittayong Surakitbanharn, David Ebert

Deck.gl: Large-scale Web-based Visual Analytics Made Easy, Yang Wang

SMART: Social Media Analytics and Reporting Toolkit, Jiawei Zhang, Junghoon Chae, Chittayong Surakitbanharn, David Ebert

Software-Enhanced Capabilities of a Ultra-High-Resolution Video Wall, Ramses van Zon, Marcelo Ponce

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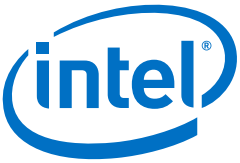

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