Welcome to IEEE VIS 2018!

For the second time, IEEE VIS comes to Europe! Berlin is one of the most vibrant and interesting cities in Europe. It offers many cultural highlights, historic sites, touristic sightseeing as well as plenty of restaurants and entertainment around.

The conference is held 21-26 October 2018 in the Estrel Hotel Berlin. It includes programs for students, academics, artists, industry and commercial practitioners, government researchers, and anyone with interests in visualization and data analytics.

The three main conferences IEEE Visual Analytics in Science and Technology (VAST), IEEE Information Visualization (InfoVis), and IEEE Scientific Visualization (SciVis), feature a record number of full paper presentations. In addition, we have a variety of tutorials, workshops, art programs, panels, demonstrations, posters and exhibitions. For the first time, VIS 2018 has an Inclusivity & Diversity Scholarship program.

We expect more than 1000 participants from dozens of countries. Enjoy a week full of discussions, insights, ideas, meetings, inspirations and solutions around all aspects of visualization. Enjoy Berlin!

Holger Theisel, University of Magdeburg
VIS 2018 General Chair

Berlin

Explore this unique city along with attending IEEE VIS! Despite being a hotspot, hotel and restaurant prices are still rather affordable in Berlin.

Berlin has a highly developed transportation infrastructure providing diverse modes of urban mobility. Long-distance rail lines connect Berlin with all major German cities and with many cities in neighboring European countries. Berlin’s local public transport network consists of several integrated systems. These include the U-Bahn and S-Bahn urban rail systems, regional railway services, a tramway system, a bus network and a number of ferry services. There are a large number of common interchange stations between the different modes.

The conference hotel is located in the district Berlin-Neukölln. Neukölln is a part of Berlin with international flair. In the past few years, northern Neukölln has undergone a transformation and has seen a huge influx of students and artists as the area becomes increasingly popular. Close to the conference hotel, there are plenty of restaurants. All important tourist attractions in Berlin can be reached by public transportation within a few minutes.

Welcome to IEEE VIS 2018!
ESTREL HOTEL & CONGRESS CENTER

1 Conference Registration
Located on ground floor: Foyer Estrel Hall
Saturday 6:00 PM–8:00 PM
Sunday & Tuesday 7:30 AM–5:00 PM
Monday, Wednesday, Thursday 8:00 AM–5:00 PM
Friday 8:00 AM–11:00 AM

2 Tutorials, Workshops, Pre-approved Events
Located on ground floor: Conv 1, Sec C / Conv 1, Sec D / Estrel Hall A / Estrel Hall B / Estrel Hall C / Room Paris
Located on 1st floor: Room II / Room III
Sunday–Monday 9:00 AM–6:00 PM

3 Conference Sessions
Located on ground floor: Conv 1, Sec C / Conv 1, Sec D / Estrel Hall A+B / Estrel Hall C
Located on 2nd floor: Room IV
Tuesday 8:30 AM–6:00 PM
Wednesday—Thursday 9:00 AM–6:00 PM
Friday 9:00 AM–12:30 PM

4 Posters
Located on ground floor: Foyer Estrel Hall / Foyer 1

5 Supporter Exhibition
Located on ground floor: Foyer 3
Tuesday—Thursday 10:40 AM–6:00 PM

6 Arts Program
Located on ground floor: Room Paris
Opening Tuesday 7:00 PM
Exhibition Wednesday—Thursday 9:00 AM–6:00 PM

7 Speaker Preparation
Located on 2nd floor: Room 30241
Sunday—Thursday 9:00 AM–6:00 PM

8 Meetup Rooms
Located on 3rd & 4th floor:
Rooms 30310 / 30312 / 30341 / 30441
Sunday—Friday, Schedule at Registration Desk

9 Interview Room
Located on 2nd floor: Room 30210
Sunday—Friday, Schedule at Registration Desk

10 VISKids Room
Located on 2nd floor: Room 30212
Sunday—Friday

All participants will have free W-LAN access:
The W-Lan login is: VIS2018
password: Berlin2018
Abstract

In the past year, Augmented Reality (AR) has been introduced in several products of premier technology companies, addressing billions of mobile computing users. In particular, a new breed of AR games is engaging and visually appealing. In contrast, non-entertainment applications of AR generally tend to lack sophisticated content. This can be related to the fact that AR developers are only learning how to effectively use the new medium. But it also has to do with the lack of overlap in AR research and visualization research. While AR research has mostly been driven by computer vision with minimal consideration of the visual output, VIS is the field where the perceptual and cognitive foundations of visual information are studied. AR needs VIS! As AR matures, it will be vital to bring the two fields together. VIS needs to address the new medium AR, embracing its two key aspects: mobility and mixed real+virtual perception. AR poses new challenges for VIS, as the visual information needs to adapt to reality rather than shaping the entire visual domain. This talk will discuss fundamental properties of AR visualization and present examples of previous, current and future work.

Bio

Dieter Schmalstieg is full professor and head of the Institute of Computer Graphics and Vision at Graz University of Technology, Austria. His current research interests are augmented reality, virtual reality, computer graphics, visualization and human-computer interaction. He received Dipl.-Ing. (1993), Dr. techn. (1997) and Habilitation (2001) degrees from Vienna University of Technology. He is author and co-author of over 300 peer-reviewed scientific publications with over 14,000 citations, with over twenty best paper awards and nominations. His recent textbook "Augmented Reality - Principles and Practice" (2016) is published by Addison-Wesley Professional. His organizational roles include associate editor in chief of IEEE Transactions on Visualization and Computer Graphics, member of the editorial advisory board of computers & graphics and of the Springer Virtual Reality journal, member of the steering committee of the IEEE International Symposium on Mixed and Augmented Reality, chair of the EUROGRAPHICS working group on Virtual Environments (1999-2010), key researcher of the K-Plus Competence Center for Virtual Reality and Visualization in Vienna and key researcher of the Know-Center in Graz. In 2002, he received the START career award presented by the Austrian Science Fund. In 2012, he received the IEEE Virtual Reality technical achievement award for seminal contributions to the field of Augmented Reality. He was elected as a senior member of IEEE, as a member of the Austrian Academy of Sciences and as a member of the Academia Europaea. In 2008, he founded the Christian Doppler Laboratory for Handheld Augmented Reality.
Can I Believe What I See?  
Information-Theoretic Algorithm Validation

Joachim M. Buhmann
Department of Computer Science at ETH Zurich
Friday, 26 October 2018, 11:00 AM–12:00 PM @ Convention Hall 1, Section C

Abstract

Data Science promises us a methodology and algorithms to gain insights in ubiquitous Big Data. Sophisticated algorithmic techniques seek to identify and visualize non-accidental patterns that may be (causally) linked to mechanisms in the natural sciences, but also in the social sciences, medicine, technology, and governance. When we use machine learning algorithms to inspect the often high-dimensional, uncertain, and high-volume data to filter out and visualize relevant information, we aim to abstract from accidental factors in our experiments and thereby generalize over data fluctuations. Doing this, we often rely on highly nonlinear algorithms.

This talk presents arguments advocating an information-theoretic framework for algorithm analysis, where an algorithm is characterized as a computational evolution of a posterior distribution on the output space with a quantitative stopping criterion. The method allows us to investigate complex data analysis pipelines, such as those found in computational neuroscience, neurology, and molecular biology. I will demonstrate this concept for the validation of algorithms using the example of a statistical analysis of diffusion tensor imaging data. In addition, on the example of gene expression data, I will demonstrate how different spectral clustering methods can be validated by showing their robustness to data fluctuations and yet sufficient sensitivity to changes in the data. All in all, an information-theoretical method is presented for validating data analysis algorithms, offering the potential of more trustful results in Visual Analytics.

Bio

Joachim M. Buhmann is full professor in the Department of Computer Science at ETH Zurich since 2003 representing the research area “Information Science and Engineering”. He studied physics at the Technical University of Munich and received a doctoral degree for his research work on artificial neural networks. After research appointments at the University of Southern California (1988-1991) and at the Lawrence Livermore National Laboratory (1991-1992) he served as a professor for applied computer science at the University of Bonn (1992-2003).

His research interests range from statistical learning theory to applications of machine learning and artificial intelligence. Research projects are focused on topics in neuroscience, biology and medical sciences, as well as signal processing and computer vision.

He headed the German Society for Pattern Recognition (DAGM e.V.) from 2009-15 and was elected as their honorary member in 2017. In 2014-17 he served as Vice-Rector for Study Programmes at ETH Zurich. The Swiss Academy of Technical Sciences SATW elected him as a regular member in 2017. He serves also as a research council member of the Swiss National Science Foundation.
Diversity & Inclusivity

Promoting and fostering inclusion is important to IEEE VIS. The IEEE VIS community provides opportunities to underrepresented groups as well as education to the community on the benefits of a more inclusive culture and programming. Acknowledging the uniqueness of each individual, IEEE VIS seeks to cultivate an environment that encourages freedom of expression. As part of our efforts, we are proud to sponsor a variety of events and programs at VIS that are focused on inclusion and diversity including the Inclusivity & Diversity Scholarship program, VISkids Childcare grant program, and meetup events.

IEEE VIS is committed to providing an inclusive and harassment-free environment in all interactions regardless of gender, sexual orientation, disability, physical appearance, race, or religion. Our Code of Conduct is available at: http://ieeevis.org/year/2018/info/inclusion-and-diversity/code-of-conduct

Please contact ombuds@ieeevis.org if you experience, observe, or have knowledge of behavior in violation of the Code of Conduct.

Please contact inclusivity@ieeevis.org with any questions about the Code of Conduct and Inclusivity & Diversity at IEEE VIS.

VisInPractice Practitioner Guide

Use this key to attend recommended sessions for Practitioners. See the full practitioner guide at http://visinpractice.org.

- AP | All Practitioners
- DS | Data Science and Machine Learning
- BA | Biomedical Applications
- DJ | Data Journalism & News Graphics
- UX | User Experience, Human Factors, and Interaction Design
- SS | Simulation Science

IEEE VIS 2019 will be the year’s premier forum for advances in theory, methods, and applications of visualization and visual analytics. The conference will convene an international community of researchers and practitioners from universities, government, and industry to discuss findings and achievements in the design and use of visualization interfaces. We invite you to share your research, insights, experience, and enthusiasm at Visual Analytics Science and Technology (VAST), Information Visualization (InfoVis), Scientific Visualization (SciVis) and the other co-located events that we are planning. For 2019, IEEE VIS will take place in Vancouver, BC, Canada. One of Canada’s most iconic tech cities, Vancouver is known for its scenic beauty, outdoor activities, and vibrant west-coast culture.

Call for Participation
20–25 October 2019
Vancouver, BC, Canada

15th IEEE VAST Conference
26th IEEE InfoVis Conference
30th IEEE SciVis Conference

www.ieeevis.org

Follow @ieeevis to keep up with conference activities and announcements.

Questions? Email info@ieeevis.org

VIS 2019 General Chair:
Brian Fisher, Simon Fraser University
Alex Endert, Georgia Institute of Technology
Wesley Willett, University of Calgary
**TUESDAY, 23 OCTOBER**

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<tr>
<th>Time</th>
<th>Event</th>
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<tbody>
<tr>
<td>8:30 AM</td>
<td>VIS Welcome (8:30–8:45 AM)</td>
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<td>9:00 AM</td>
<td>VGTC Technical Awards (8:45–9:00 AM)</td>
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<td>Test of Time Awards (9:00–10:00 AM)</td>
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<td></td>
<td>VIS Best Papers (10:00–11:00 AM)</td>
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<td>@ Conv 1, Sec C+D</td>
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<td>10:40 AM</td>
<td>BREAK</td>
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<td>11:00 AM</td>
<td>BREAK (11:00–11:20 AM)</td>
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<td>12:40 PM</td>
<td>LUNCH</td>
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<td>(12:20–2:05 PM)</td>
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<td>2:05 PM</td>
<td>VAST Opening: Evaluation and Theory</td>
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<td>2:05 PM</td>
<td>INFOVIS Opening: Multiple Dimensions</td>
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<tr>
<td>2:20 PM</td>
<td>SCIVIS Opening: Flow Features</td>
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<td>4:00 PM</td>
<td>BREAK</td>
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<td>4:20 PM</td>
<td>Spatio-Temporal Data</td>
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<td>Evaluation &amp; Applications</td>
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<td>Biological Applications</td>
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<td>Supporters Presentations</td>
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<td>6:00 PM</td>
<td>VIS Arts Program Opening Event @ Room Paris + Foyer</td>
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<td>7:00 PM</td>
<td>VIS Arts Program Opening Event @ Room Paris + Foyer</td>
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<tr>
<td>9:00 PM</td>
<td>VIS Arts Program Opening Event @ Room Paris + Foyer</td>
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**WEDNESDAY, 24 OCTOBER**

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<thead>
<tr>
<th>Time</th>
<th>Event</th>
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<tr>
<td></td>
<td>Restructuring IEEE VIS for the Future (1:00–2:20 PM) @ Conv 1, Sec C</td>
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<td>4:20 PM</td>
<td>Fast Forward (Thu &amp; Fri Sessions) (4:20–5:20 PM) @ Estrel A+B</td>
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<td>Posters + Networking + Hiring events (5:20–7:00 PM) @ Foyers</td>
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<td>7:00 PM</td>
<td>VIS Dinner Banquet (7:00–9:00 PM) @ Conv 1, Sec C+D</td>
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### THURSDAY, 25 OCTOBER

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
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<tbody>
<tr>
<td>1:00 PM</td>
<td><strong>VIS 2019 Kick-off Meeting</strong> (1:00–2:20 PM) @ Estrel C</td>
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<tr>
<td>BREAK</td>
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<tr>
<td>2:20 PM</td>
<td><strong>VisAP Session 2</strong></td>
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<td>LUNCH</td>
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<td><strong>Deep Learning</strong></td>
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<td><strong>Design &amp; Storytelling</strong></td>
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<td><strong>Scalable Techniques</strong></td>
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<td><strong>InfoVis: Interaction</strong></td>
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<td><strong>CG&amp;A Session 2</strong></td>
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<td><strong>Panel: Meet the Founders: How to Start and Sustain a Business in the Visualization Space</strong></td>
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### FRIDAY, 26 OCTOBER

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
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<tbody>
<tr>
<td>9:00 AM</td>
<td><strong>Event, Sequence, and ML</strong></td>
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<td><strong>Uncertainty &amp; Error</strong></td>
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<td><strong>Time-varying Data</strong></td>
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<td>BREAK</td>
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<tr>
<td>10:40 AM</td>
<td><strong>VIS Capstone</strong> (11:00 AM–12:00 PM)</td>
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<td>11:00 AM</td>
<td><strong>Can I Believe What I See?—Information-Theoretic Algorithm Validation</strong></td>
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<td>Joachim M. Buhmann, ETH Zurich</td>
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<td><strong>VIS Closing (12:00–12:30 PM)</strong> @ Conv 1, Sec C</td>
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<td>LUNCH</td>
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<td>12:40 PM</td>
<td><strong>Break</strong></td>
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<td>2:20 PM</td>
<td><strong>Break</strong></td>
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<td>4:00 PM</td>
<td><strong>VAST</strong></td>
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<td><strong>INFOVIS</strong></td>
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<td>6:00 PM</td>
<td><strong>SCIVIS</strong></td>
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**Open Discussion Session: Restructuring IEEE VIS for the Future**

Wednesday, 1:00–2:20 PM @ Conv 1, Sec C

IEEE VIS is at a crossroads: for many years it has been subdivided into the SciVis, InfoVis, and Visual Analytics conferences. There is now considerable appetite to consider alternate structures, such as a more unified conference, that may better enhance vibrancy and growth. Our goals are to preserve intellectual diversity while promoting organizational consistency. The organizers of this open discussion have been charged by the VIS Executive Committee (VEC) to guide this decision-making process, which started in 2016. The goal of this session is to provide a broad cross-section of the community a voice into the set of options under consideration. Your participation will shape the future of our flagship venue and thus the field of visualization for the coming decades.

**Postsers**

Located in Foyer 1 & Foyer Estrel Hall

Sunday—Thursday, 9:00 AM–6:00 PM

**Exhibitions**

Located in Foyer 3

Tuesday—Thursday, 10:40 AM–6:00 PM

**VIS Arts Program**

Located in Room Paris

Opening, Tuesday 7:00 PM

Exhibition, Wednesday—Thursday, 9:00 AM–6:00 PM
Meetups: VIS Newcomers
Organizers: Anastasia Bezerianos, Jonathan Woodring, Weiwei Cui
Attending VIS for the first time can be overwhelming, especially if you don’t know any other attendees, it’s your first conference, or if you are new to visualization. The VIS Newcomers Meetup is a conference orientation and informal lunch intended for first-time VIS attendees, regardless of experience, from students to practitioners. This allows participants to meet other conference goers and learn various tips for attending VIS. The meetup will start with a short presentation containing conference tips. Following the presentation, meetup attendees will split into small groups led by experienced VIS attendees to continue discussions over lunch and get to know each other. Contact: community@ieeevis.org

Workshops and Tutorials

**Full Day**

**Workshop (9:00 AM–6:00 PM)**

**VAST Challenge**
Contributors: Kristin Cook, Jordan Crouser, 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.

**Workshop (9:00 AM–6:00 PM)**

**Visualization for the Digital Humanities**
Contributors: Mennatallah El-Assady, Stefan Jänicke, David Joseph Wrisley, Eric Alexander, Adam James Bradley, Min Chen, Uta Hinrichs
We are witnessing a growth in collaborations and interdisciplinary research between the humanities and computing.

In this year’s workshop, we hope to feature some of this innovation in the realm of applied visualization, as well as to explore new avenues for interdisciplinary and collaborative research between visualization and the humanities.

We will explore different vocabularies and conceptual frameworks to think about how to engage differences as potentially rich opportunities rather than seeing them as barriers.

Half Day

**Workshop (9:00 AM–12:40 PM)**

**UX Toward a Design Language for Data Physicalization**
Contributors: Trevor Hogan, Uta Hinrichs, Jason Alexander, Samuel Huron, Sheelagh Carpendale, Eva Hornecker
The aim of this workshop is to draw together practitioners and researchers in order to discuss different approaches toward a design language for data physicalization. Through a series of invited talks alternating with hands-on discussions of existing physicalization examples, the workshop will start to consolidate different efforts of characterizing and evaluating the core properties or “variables” that drive data physicalization, and to define a research agenda in this area.

**Workshop (9:00 AM–12:40 PM)**

**UX Visualization for Communication (VisComm)**
Contributors: Robert Kosara, Benjamin Watson
While visualization research is still largely focused on data analysis, most people’s experience with visualization is in the form of communication and presentation, as seen now in publications such as the New York Times and from an independent community of visualization practitioners and bloggers. The VisComm workshop will bring together both practitioners and researchers from a broad range of disciplines to address the questions raised by visualization’s new communicative role. We encourage participation from journalists, designers and others that do not typically attend IEEE VIS and write academic manuscripts. Accordingly, we seek not only short papers but also visual case studies: one-page abstracts with video walkthroughs of communicative visualizations.

**Tutorial (9:00 AM–12:40 PM)**

**UX Introduction to IATK: An Immersive Visual Analytics Toolkit**
Contributors: Maxime Cordeil, Andrew Cunningham, Tim Dwyer, Kim Marriott, Bruce H. Thomas
Immersive Analytics Toolkit is an open source visualization toolkit for the Unity game engine that fills this gap. Specifically, IATK supports an infovis pipeline for virtual and augmented reality environments, visualizes large (up to 1 million) data points at an optimal framerate for immersive applications, and provides a technology-agnostic model for user interactions with immersive visualizations. This tutorial will introduce the Unity game engine and teach practical skills for implementing immersive data visualizations using IATK.
Call for Participation

VIS 2019 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

DOCTORAL COLLOQUIUM 2019
**BELIV: Evaluation and Beyond**

*Convention Hall 1, Section C*

**9:00–10:40 AM**

**Session 1**

**Welcome + Keynote + Replication Mini-Tutorials**  
Chair: Petra Isenberg

**Keynote Presentation**

*Reproducibility: Or, How I Learned to Stop Worrying and Love Open Science*

Jon Tennant

You can barely go anywhere within research these days without hearing the term ‘reproducibility crisis’. It is becoming more and more common for meta-analyses of research to fail to reproduce key discoveries within the scholarly literature. At the same time, researchers are under increasing pressure to ‘publish or perish’, embellish their research findings, and prioritise impact/prestige of publication venue over research rigour. This is clearly not how science is supposed to work. One of the key aspects of the global Open Science ‘movement’ is to help to solve these issues to do with incentives, questionable research practices, and a lack of reproducibility or repeatability across different research disciplines.

During this talk, you will hear about the wave of new practices and services to help increase the reproducibility of research across different research fields, from open notebook science, pre-registrations, through to mandatory code and data sharing. This is still very much a new and ongoing evolution that is helping to transform the way research is conducted, but is already having a huge impact in helping to improve the reliability of modern science. Researchers who are adopting and supporting these practices are already becoming leaders in their respective fields and helping to drive real change.

*Mini-tutorials based on these papers:*

- **Towards Designing Unbiased Replication Studies in Information Visualization**, Poorna Talkad Sukumar, Ronald Metoyer
- **Skipping the Replication Crisis in Visualization: Threats to Study Validity and How to Address Them**, Robert Kosara, Steve Haroz

**10:40–11:00 AM**

Coffee Break

**11:00 AM–12:40 PM**

**Session 2**

**Panel—A Roadmap For Replication in Visualization**  
Chair: Michael Sedlmair

**Author panelists**

- **Open Practices in Visualization Research**, Steve Haroz
- **Requirements for Reproducibility of Research in Situational and Spatio-Temporal Visualization**, André Calero Valdez, Anne Kathrin Schaar, Julian Romeo Hildebrandt, Martina Ziefle

**Invited panelists**

- Jason Dykes, Nils Gehlenborg, Paul Rosenthal, Danielle Albers Szafir

**12:40–2:20 PM**

Lunch Break

**2:20–4:00 PM**

**Session 3**

**Paper Presentations + Break-out Sessions**  
Chair: Miriah Meyer

- **Towards Characterizing Domain Experts as a User Group**, Yuet Ling Wong, Krishna Madhavan, Niklas Elmqvist
- A **Micro-Phenomenological Lens for Evaluating Narrative Visualization**, Stanislaw Nowak, Lyn Bartram, Thecla Schiphorst
- **From Taxonomy to Requirements: A Task Space Partitioning Approach**, Mai Elshehaly, Natasha Alvarado, Lynn McVey, Rebecca Randell, Mamas Mamas, Roy A. Ruddle
- **The Garden of Forking Paths in Visualization: A Design Space for Reliable Exploratory Visual Analytics**, Xiaoying Pu, Matthew Kay
- **Improving Accessibility, Replicability, and Reproducibility through Open Practices**, Steve Haroz, Andre Calero-Valdez

**4:00–4:20 PM**

Coffee Break

**4:20–6:00 PM**

**Session 4**

**Paper Presentations + Break-out Sessions**  
Chair: Tobias Isenberg

- **Lowering the Barrier for Successful Replication and Evaluation**, Hendrik Lücke-Tieke, Marcel Beuth, Philipp Schader, Thorsten May, Jürgen Bernard
- **A Case for Cognitive Models in Visualization Research**, Lace M. Padilla
- **Heuristic Evaluation in Visualization: An Empirical Study**, Beatriz Sousa Santos, Samuel Silva, Paulo Dias
- **Replication of Qualitative Research in Visualization**, Poorna Talkad Sukumar, Robert Kosara
9:00–9:10 AM
Opening Remarks

9:10–10:15 AM
Keynote Presentation
Large Data Analysis and Visualization—New Approaches for Dynamic Volumes and Particle Data Sets
Thomas Ertl, University of Stuttgart

As data set sizes and complexity continue to grow, more elaborate techniques for their interactive analysis and visualization are being developed in our community. This talk presents some of the recent contributions of the VISUS group at the University of Stuttgart focusing on dynamic volumes and particle data sets. For volumes we exploit similarity between time steps to select the most important characteristic temporal features, while still allowing exploration, and we develop intermediate view dependent representations for hybrid in situ approaches. New adaptive volume rendering algorithms allow for maintaining interactive frame rates by balancing quality and sampling errors. For large particle data sets, we present multi-GPU techniques for static astrophysical datasets of more than trillions of particles; and for dynamic molecular trajectories we elaborate on the OSPRay integration into our Megamol framework. We conclude with our first attempts to learn interesting features in volumetric time series and performance characteristics of visual computing systems.

10:15–10:40 AM
Uncertain Data
Chair: Hanqi Guo

Visual Analysis of Simulation Uncertainty Using Cost-Effective Sampling, Annie Preston, Yiran Li, Franz Sauer, Kwan-Liu Ma

10:40–11:00 AM
Coffee Break

11:00–11:50 AM
Data Reduction
Chair: Peer-Timo Bremer

VOIDGA: A View-Approximation Oriented Image Database Generation Approach, Jonas Lukasczyk, Eric Kinner, James Ahrens, Heike Leitte, Christoph Garth
Lifited Wasserstein Matcher for Fast and Robust Topology Tracking, Maxime Soler, Mélanie Plainchault, Bruno Conche, Julien Tierny

11:50 AM–12:40 PM
Panel
Progressive Visualization and Visual Analytics

Progressive visualization, also known as Online Aggregation, consists of splitting long and expensive computations into a series of approximate results improving with time; in this process, partial or approximate results are then rapidly returned to the user and can be interacted with in a fluent and iterative fashion. With the increasing growth in data, such progressive data analysis approaches will become one of the leading paradigms for data exploration systems, but it also will require major changes in the algorithms, data structures, and visualization tools used today. In early October 2018, a Dagstuhl Seminar explored progressive visualization; in this panel, speakers from that seminar will share outcomes from that conversation, and explore ways the LDAV community can adapt these approaches.

12:40–2:20 PM
Lunch Break

2:20–4:00 PM
Parallelism & Approximation
Chair: Steffen Frey

DPP-PMRF: Rethinking Optimization for a Probabilistic Graphical Model Using Data-Parallel Primitives, Brenton Lessley, Talita Perciano, Colleen Heinemann, David Camp, Hank Childs, E. Wes Bethel
Parallel Partial Reduction for Large-Scale Data Analysis and Visualization, Wenbin He, Hanqui Guo, Tom Peterka, Sheng Di, Franck Cappello, Han-Wei Shen
Comparing Binary-Swap Algorithms for Odd Factors of Processes, Kenneth Moreland
Foundations of Multivariate Functional Approximation for Scientific Data, Tom Peterka, Youssef S. G. Nashed, Iulian Grindeanu, Vijay S. Mahadevan, Raine Yeh, Xavier Tricoche

4:00–4:20 PM
Coffee Break

4:20–5:35 PM
Fidelity & Interactivity
Chair: Tom Peterka

Galaxy: Asynchronous Ray Tracing for Large High-Fidelity Visualization, Greg Abram, Paul Navrátil, Pascal Grossett, David Rogers, James Ahrens
SpRay: Speculative Ray Scheduling for Large Data Visualization, Hyungman Park, Donald Fussell, Paul Navrátil
Adaptive Encoder Settings for Interactive Remote Visualization on High-Resolution Displays, Florian Frieß, Mathias Landwehr, Valentin Bruder, Steffen Frey, Thomas Ertl

5:35–5:45 PM
Best Paper Awards & Closing Remarks

5:45–6:05 PM
Poster Presentations
Please see page 31 for the list of accepted posters.

7:00–9:00 PM
Vis Opening Reception (includes LDAV Poster Session)
MONDAY, 22 OCTOBER

4:00–4:30 PM

Meetups: VISKids Hello
Organizers: Michelle A. Borkin, R. Jordan Crouser, Kelly Gaither
Come to this gathering to learn more about the VISKids grants and conference activities, connect with other parents and families at the conference, and provide feedback and ideas for this and future years. The Inclusivity & Diversity Committee members will answer all your questions. Everyone is welcome to attend, including VISKids/families.
VISKids has provided child care grants to VIS conference attendees since 2015. As part of Inclusivity and Diversity at IEEE VIS, VISKids also organizes activities at the conference, and has a meeting room on-site. The activities and the room are open to everyone, not just awardees of the child care grant program.

Workshops and Tutorials

Full Day

Workshop (9:00 AM–6:00 PM)
VisGuides: 2nd Workshop on the Creation, Curation, Critique and Conditioning of Principles and Guidelines in Visualization
Contributors: Alexandra Diehl, Benjamin Bach, Alfie Abdul-Rahman
The ever-increasing global awareness, practice, and teaching of information and data visualization include a growing audience of consumers and creators. We, as a scientific community must put careful emphasis on the collection and curation of knowledge in the area. The goal of this workshop is to discuss and consolidate guidelines, best practices, controversies, and success stories in the field of information visualization.

Workshop (9:00 AM–12:40 PM)
VISREG - Visual Summarization and Report Generation: Beyond Scatter-Plots and Bar-Charts
Contributors: Johanna Schmidt, Gabriel Mistelbauer
This workshop investigates visual summaries of data and meaningful representations for static reports. Visual summaries have/should/aim to combine different data aspects into a concise overview in order to communicate findings to external collaborators. The workshop consists of paper presentations that introduce new techniques for visual summarization. Based on these talks, common strategies, open research questions and potential future research directions will be identified.

Workshop (9:00 AM–12:40 PM)
DS Machine Learning from User Interaction for Visualization and Analytics
Contributors: John Wenskovitch, Michelle Dowling, Chris North, Remco Chang, Alex Endert, David Rogers
This workshop will bring together researchers from across the VIS community to share their knowledge and build collaborations at the intersection of the Machine Learning and Visualization fields, with a focus on learning from user interaction. We plan to generate open discussion about how we currently learn from user interaction and where we can go with future research in this area. We hope to foster discussion regarding systems, interaction models, and interaction techniques.

Tutorial (9:00 AM–12:40 PM)
Urban Trajectory Data Visualization
Contributors: Ye Zhao, Jing Yang, Wei Chen, Shamal AL-Dohuki
This tutorial aims to help visualization researchers and practitioners in the development of visualization systems of big trajectory datasets. Our tutorial contents will focus on important and practical topics people usually face when developing a visualization system of urban trajectories including: trajectory data representation, processing, indexing, and data queries; trajectory data visualization tasks, challenges, and techniques; developing web-based interactive visualization system; case studies of urban visual analytics with shared source codes and examples.

Half Day

Workshop (9:00 AM–12:40 PM)
CityVis – Urban Data Visualization
Contributors: Sebastian Meier, Nina Hälker, Sarah Goodwin
Visualization helps us unravel the complex urban fabrics that form our cities. But, there is a crucial need to bridge the gap between the increasing flood of urban data and the capacity to integrate this into effective and informed decisions. Focusing on an explicitly “human-centric” perspective the CityVis workshop asks how data and visualization can be used to serve and better understand or organize urban processes.

Tutorial (2:20–6:00 PM)
DS Visualization for AI Explainability (VISxAI)
Contributors: Mennatallah El-Assady, Duen Horng Chau, Adam Perer, Hendrik Strobelt, Fernanda Viegas
The goal of this workshop is to initiate a call for “explainables” that explain how AI techniques work using visualizations. We believe the VIS community can leverage their expertise in creating visual narratives to bring new insight into the often obfuscated complexity of AI systems.

Workshop (2:20–6:00 PM)
Cost-benefit Analysis in Visualization: Theory and Practice
Contributor: Min Chen
In this tutorial, we will focus on the topic of analyzing the cost-benefit of visualization and visual analytics systems. The delivery of the tutorial will be structured in the order of “from practice to theory and then to practice again”. One objective of this tutorial is to help remove the barrier for visualization researchers to enter the area of “information theory to visualization”, while examining the broad scope of future directions of research.
VizSec: Visualization for Cyber Security

Convention Hall 1, Section C

9:00–9:15 AM
Opening Remarks
Chair: Diane Staheli

9:15–10:15 AM
Keynote Presentation
Speaker: Dr. Sandro Gaycken, Senior Researcher and Director of the Digital Society Institute, ESMT Berlin

10:15–10:40 AM
VizSec Poster and Demo Fast Forward
Chair: Jörn Kohlhammer
Please see p. 31 for the list of accepted posters.

10:40–11:00 AM
Coffee Break

11:00 AM–12:40 PM
Paper Session: Networks and Privacy
Chair: Sophie Engle
Visual-Interactive Identification of Anomalous IP-Block Behavior Using Geo-IP Data, Alex Ulmer, Marija Schufrin, David Sessler, Jörn Kohlhammer
Looking for a Black Cat in a Dark Room: Security Visualization for Cyber-Physical System Design and Analysis, Georgios Bakirtzis, Brandon James Simon, Cody H Fleming, Carl R. Elks
Visual Analytics for Root DNS Data, Eric Krokos, Alexander R Rowden, Kirsten Whitley, Amitabh Varshney
An Empirical Study on Perceptually Masking Privacy in Graph Visualizations, Jia-Kai Chou, Chris Bryan, Jing Li, Kwan-Liu Ma

12:40–2:20 PM
Lunch Break

2:20–3:35 PM
Paper Session: Analytics
Chair: John Goodall
Building a Machine Learning Model for the SOC, by the Input from the SOC, and Analyzing it for the SOC, Awalin, Sopan, Matthew Berninger, Murali Kiran Mulakaluri, Raj Katakam
Visualizing Automatically Detected Periodic Network Activity, Robert Gove, Lauren Deason
Crush your data with ViC’ES then CHISSL away, Dustin L Arendt, Lyndsey Franklin, Fumeng Yang, Brooke Brisbois, Ryan LaMothe

3:45–4:00 PM
Demos

4:00–4:20 PM
Coffee Break

4:20–5:10 PM
Papers Session: Malware Analysis
Chair: Jörn Kohlhammer
[Best Paper] ROPMate: Visually Assisting the Creation of ROP-based Exploits, Marco Angelini, Graziano Blasilli, Pietro Borrello Borrello, Emilio Coppa, Daniele Cono D’Elia, Serena Ferracci, Simone Lenti, Giuseppe Santucci
Eventpad: Rapid Malware Analysis and Reverse Engineering using Visual Analytics, Bram Cappers, Paulus N. Meessen, Sandro Etalle, Jarke van Wijk

5:10–5:50 PM
Papers Session: Short Papers
Chair: Robert Gove
TAPESTRY: Visualizing Interwoven Identities for Trust Provenance, Yifan Yang, John Collomosse, Arthi Kanchana Manohar, Jo Briggs, Jamie Steane

5:50–6:00 PM
Closing
Chair: Diane Staheli
<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
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<tbody>
<tr>
<td>9:00–9:10 AM</td>
<td>Opening Address</td>
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<tr>
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<td>General Chairs: Torsten Möller, Shixia Liu</td>
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<td>9:10–10:10 AM</td>
<td>Keynote Presentation</td>
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<td></td>
<td>Automating Analysis?</td>
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<td>Pat M. Hanrahan, Stanford University</td>
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<td>There have been great advances in machine learning lately, in particular, deep learning. The result has been even more intelligent systems, such as image recognition, AlphaGo and self-driving cars. The technologies of machine learning are similar in many ways to those used in statistical data analysis. So, a natural question is —can AI be applied to analysis? That is, can people doing analysis be replaced by automated systems? In this talk, I will explore this question.</td>
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<td>10:10–10:40 AM</td>
<td>Session 1: Interactive ML</td>
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<td>BEAMES: Interactive Multi-Model Steering and Inspection for Regression Tasks, Subhajit Das, Dylan Cashman, Remco Chang, Alex Endert</td>
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<td>Homology-Preserving Dimensionality Reduction via Manifold Landmarking and Tearing, Lin Yan, Yaodong Zhao, Paul Rosen, Carlos Scheidegger, Bei Wang</td>
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<td>11:00 AM–12:00 PM</td>
<td>Keynote Presentation</td>
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<td>Analytics Illustrated - How Visualization Is Changing Sports Forever</td>
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<td>Kirk Goldsberry, San Antonio Spurs</td>
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<td>Since Michael Lewis published “Moneyball” in 2003, sports discourse has become increasingly more analytical and data driven. However, only recently is it becoming properly visual. The intersection of visualization and sports analytics is a truly exciting place in 2018, and this presentation describes how and why visualization is uniquely equipped to reform and reshape sports discourse forever. The presentation includes two sections. First, we investigate how visualization has helped shaped new analytical awakenings in professional basketball this decade and how those awakenings are reshaping the entire aesthetic of the sport. Second, we examine the relatively slow adoption of visual analytics in the sports world.</td>
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<td>12:00–12:40 PM</td>
<td>Session 2: Deep Learning</td>
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<td>Visualization-Assisted Development of Deep Learning Models in Offline Handwriting Recognition, Martin Schall, Dominik Sacha, Manuel Stein, Matthias Franz, Daniel Keim</td>
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<td>Data2Vis: Automatic Generation of Data Visualizations Using Sequence to Sequence Recurrent Neural Networks, Victor C. Dibia, Çağatay Demiralp</td>
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<td>12:40–2:20 PM</td>
<td>Lunch Break</td>
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<td>2:20–3:20 PM</td>
<td>Keynote Presentation</td>
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<td>Humans and AI: From Love-Hate Relationship to Dream Team?</td>
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<td>Daniela Oelke, Siemens AG</td>
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<td>Artificial Intelligence (AI) is on the rise all around us. On the one hand, we love it, because it enables services and features that would not be possible without it. On the other hand, we fear it because of the lack of transparency that these systems often entail despite the huge impact they can have. In my talk, I am going to give you an introduction to the field of Explainable Artificial Intelligence (XAI) which aims at providing transparency for AI systems. I will also share my experiences with employing Explainable AI in an industrial setting. Besides, I am going to exemplify the value of visualization for Explainable AI and highlight what role we as a visualization community can play in shaping the future of applied Artificial Intelligence.</td>
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<td>3:20–4:00 PM</td>
<td>Session 3: Data Science in Domains</td>
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<td>Tackling Similarity Search for Soccer Match Analysis: Multimodal Distance Measure and Interactive Query Definition, Manuel Stein, Halldor Janetzko, Tobias Schreck, Daniel Keim</td>
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<td>Visual Analytics of Volunteered Geographic Information: Detection and Investigation of Urban Heat Islands, Daniel Seebacher, Matthias Miller, Tom Polk, Johannes Fuchs, Daniel Keim</td>
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<td>Uncertainty-Aware Visualization for Analyzing Heterogeneous Wildfire Detections, Annie Preston, Maksim Gomov, Kwan-Liu Ma</td>
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<td>4:00–4:20 PM</td>
<td>Coffee Break</td>
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<td>4:20–4:50 PM</td>
<td>Guided Visual Exploration of Cyclical Patterns in Time-series, Davide Ceneda, Theresa Gschwandtner, Silvia Miksch, Christian Tominski</td>
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<td>Progressive Sequential Pattern Mining: Steerable Visual Exploration of Patterns with PPMT, Vincent Raveneau, Pr Yannick Prié, Julien Blanchard</td>
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<td>4:50–5:50 PM</td>
<td>Panel</td>
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<td>The Future of Visualization in Data Science</td>
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<td>Facilitator: Hanspeter Pfister</td>
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<td>Panelists: Kirk Goldsberry, Pat M. Hanrahan, Daniela Oelke</td>
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<td>5:50–6:00 PM</td>
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MONDAY

VisInPractice

Estrel Hall A

9:00–10:40 AM
VisInPractice Invited Talks I
Chair: Daniela Oelke

*glue-ing Together the Universe*, Alyssa Goodman
*Visualizing Large-Scale Geolocation Data with kepler.gl*, Shan He

10:40–11:00 AM
Coffee Break

11:00 AM–12:40 PM
VisInPractice Invited Talks II
Chair: Matthew Brehmer

*Xenographics: Why We Should All Be William Playfairs*, Maarten Lambrechts
*What I Learned Creating a 3D Visualization with 60K+ Datapoints in the Browser*, Jan Willem Tulp

12:40–2:20 PM
Lunch Break

2:20–4:00 PM
VisInPractice: Tools of the Trade
Chair: Matthew Brehmer

*Data Vis Tools, Revisited*, Lisa Charlotte Rost
*State-Of-The-Art of Commercial Visual Analytics Systems*, Michael Behrisch
*Open Discussion of Visualization Tools*

4:00–4:20 PM
Coffee Break

4:20–6:00 PM
Mini-Symposium on the Practice of Visualizing Uncertainty
Chair: Bernd Hentschel

*Primer Talk*

*Uncertainty Visualization: From Metrics to Imagery*, Kristi Potter

*Lightning Talks*

*Visualizing Uncertainties in Conflict Event Data*, Andrea Brennen
*Visualising Climate Forecasts, Managing Uncertainty and Accuracy at Seasonal and Sub-Seasonal Scales*, Fernando Cucchietti
*Hypothetical Outcome Plots: Communicating Uncertainty Through Animated Sampling*, Alex Kale
*Line Density Plots*, Stefan Hagen Weber
*Quantifying Uncertainty in Time Series Data Processing*, Christian Bors

BioVis Challenges

Estrel Hall B

9:00 AM–12:40 PM

**Contributors:** Cagatay Turkay, Nils Gehlenborg

The number of individuals in studies that are collecting clinical, genomic, and other biomedical data has been growing rapidly in recent years. For example, the UK Biobank currently makes data for 500,000 individuals available and the National Institutes of Health All of Us Program aims to collect data on a million individuals over the next few years. Similar data collection and organization efforts are also taking place at hospitals and private companies in the pharma and healthcare sectors. The breadth of these collections is also growing significantly with the increasing availability of different data channels and personal sensors, adding new layers of richness and valuable information.

In this workshop, we will discuss what unique data visualization challenges visualization of data from such studies are posing and how the visualization community can contribute to the success of those studies. This will include questions focused on visual design and interaction, but also technical and legal challenges related to data access, for a broad range of data types and driving biomedical questions.

The event will be kicked-off with short talks from experts where a series of challenges are presented, and followed by hands-on activity on these challenges by groups of visualization 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.
TUESDAY, 23 OCTOBER

8:30–11:00 AM

**VIS Welcome (8:30–8:45 AM)**
Chair: Cláudio T. Silva

**2018 VGTC Visualization Career Award,** Sheelagh Carpendale

**2018 VGTC Visualization Technical Achievement Award,** Anders Ynnerman

**AP Test of Time Awards (9:00–10:00 AM)**
Chair: Silvia Miksch

**[VAST 2008: 10 Year Test of Time Award]** Spatio-temporal Aggregation for Visual Analysis of Movements, Gennady Andrienko, Natalia Andrienko

**[InfoVis 1998: 20 Year Test of Time Award]** An Operator Interaction Framework For Visualization Systems, Ed Huai-Hsin Chi, John Riedl

**[InfoVis 2008: 10 Year Test of Time Award]** Effectiveness of Animation in Trend Visualization, George G. Robertson, Roland Fernandez, Danyel Fisher, Bongshin Lee, John T. Stasko

**[SciVis 1993: 25 Year Test of Time Award]** Texture Splats for 3D Scalar and Vector Field Visualization, Roger Crawfis, Nelson L. Max

**[SciVis 2003: 15 Year Test of Time Award]** Acceleration Techniques for GPU-based Volume Rendering, Jens H. Krüger, Rüdiger Westermann

**AP BEST Paper Awards and Talks (10:00–11:00AM)**
Chair: Chris North, Niklas Elmqvist, David Laidlaw

**J** [**VAST Best Paper Award**] TPFlow: Progressive Partition and Multidimensional Pattern Extraction for Large-Scale Spatio-Temporal Data Analysis, Dongyu Liu, Panpan Xu, Liu Ren

**J** [**InfoVis Best Paper Award**] Formalizing Visualization Design Knowledge as Constraints: Actionable and Extensible Models in Draco, Dominik Moritz, Chenglong Wang, Greg L. Nelson, Halden Lin, Adam M. Smith, Bill Howe, Jeffrey Heer

**J** [**SciVis Best Paper Award**] Deadeye: A Novel Preattentive Visualization Technique Based on Dichoptic Presentation, Andrey Krekhov, Jens Krüger

11:00–11:20 AM

Coffee Break

11:20 AM–12:20 PM

**VIS Keynote**

Speaker: Dieter Schmalstieg, Graz University of Technology

**When Visualization Met Augmented Reality**

Please see p. 4 for Keynote details.

12:20–2:05 PM

Lunch Break

12:30–2:00 PM

**Meetups: VISParents**
Organizer: Michelle A. Borkin, R. Jordan Crouser, Kelly Gaither

Whether you are a new parent, expectant parent, experienced wise parent, or considering some day to be a parent, come attend the first VISParents meet-up to discuss work-life balance topics at VIS. In this open roundtable conversation topics will include work-life balance in general, going into academia versus industry, balancing time with your VISKid, going on paternity leave, being a VISParent while completing your dissertation as a student, and being a VISParent while trying to achieve tenure as a professor. Please come share your wisdom and experiences. VISKids are also welcome to attend.

**Meetups: VisLies!**
Organizer: Kenneth Moreland, Bernice Rogowitz

This fun and engaging evening session showcases examples of egregious perceptual, cognitive, and conceptual errors in visualization, presented by members of the Vis community. Examples from our own work, from published papers, and from the internet highlight the many ways of visually misrepresenting phenomena underlying the data. This is a great opportunity for amusement and for learning, and every year we walk away with a smile on our faces and a deeper sense of responsibility that may one day impact the world. Make VisLies more fun for yourself and everyone else by sharing your favorite or most deplorable ways to misrepresent data. If you have examples to present, please visit http://vislies.org.

2:05–4:00 PM

**VAST Opening (2:05–2:20 PM)**

**VAST Papers (2:20–4:00 PM)**

**AP Evaluation and Theory**
Chair: Alvitta Ottley

**[J] Evaluating Multi-Dimensional Visualizations for Understanding Fuzzy Clusters,** Ying Zhao, Feng Luo, Minghui Chen, Yingchao Wang, Jiazhi Xia, Fangfang Zhou, Yunhai Wang, Yi Chen, Wei Chen

**[C] The Effect of Proximity in Social Data Charts on Perceived Unity,** Marlen Promann, Sabine Brunswicker


**[C] The Effect of Semantic Interaction on Foraging in Text Analysis,** John Wenskovitch, Lauren Bradel, Michelle Dowling, Leanna House, Chris North

**[J] Cost-benefit Analysis of Visualization in Virtual Environments,** Min Chen, Kelly Gaither, Nigel John, Brian McCann

11:00–11:20 AM

Coffee Break

11:20 AM–12:20 PM

**AP VIS Welcome (11:20–11:45 AM)**
Chair: Nikolas Elmqvist

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**2018 VGTC Visualization Technical Achievement Award,** Anders Ynnerman

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**AP Best Paper Awards and Talks (11:00–12:00 PM)**
Chair: Chris North, Niklas Elmqvist, David Laidlaw

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2:05–4:00 PM

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**VAST Papers (2:20–4:00 PM)**

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11:00–11:20 AM

Coffee Break

11:20 AM–12:20 PM

**VIS Keynote**

Speaker: Dieter Schmalstieg, Graz University of Technology

**When Visualization Met Augmented Reality**

Please see p. 4 for Keynote details.

12:20–2:05 PM

Lunch Break
SciVis Opening (2:05-2:20 PM)
SciVis Papers (2:20-4:00 PM)
Flow Features
Chair: Roxana Bujak

[J] Recirculation Surfaces for Flow Visualization, Thomas Wilde, Christian Rössl, Holger Theisel

[J] Objective Vortex Corelines of Finite-sized Objects in Fluid Flows, Tobias Günther, Holger Theisel

[T] Towards High-quality Visualization of Superfluid Vortices, Yulong Guo, Xiaopei Liu, Chi Xiong, Xuemiaoxu, Chi-Wing Fu


Consortium of Visualization Users (VIS) Panel

Succeeding by Failing: The Iceberg in VIS Careers
Panelists: Luana Micallef, Tatiana von Landesberger, Carla C. Schubert, Sheelah Carpendale, John Stasko, Niklas Elmqvist, G. Elisabetta Marai, Helwig Hauser, Daniel Archambault

The academic competitive environment and its ‘acceptance & rejection’ culture lead to high pressure and stress for researchers at all career stages. We will discuss such threats, coping mechanisms and ways how our community can help. Example topics include: work-life balance, dealing with rejections, providing supportive reviews, funding pressures, career prospect in times of uncertainty, and many more topics depending on the audience. Our panelists include: visualization professors with diverse expertise and seniority levels, and a psychologist/psychotherapist who also conducts research and treats academics with related psychological problems. Voice your first-hand experiences, questions and comments anonymously at http://www.luanamicallef.com/succeedingbyfailing and participate in our follow-up meetup!

4:00-4:20 PM
Coffee Break

4:20-6:00 PM

Consortium of Visualization Users (VIS) Panel

Succeeding by Failing: The Iceberg in VIS Careers
Panelists: Luana Micallef, Tatiana von Landesberger, Carla C. Schubert, Sheelah Carpendale, John Stasko, Niklas Elmqvist, G. Elisabetta Marai, Helwig Hauser, Daniel Archambault

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Meetups: Junior Faculty, Researchers, and Practitioners Happy Hour
Organizers: Kristi Potter, Remco Chang
The goal of this meetup is to provide a safe environment for junior Vis researchers to gather and discuss challenges faced in and out of the work environment. The VIS community has always been very supportive of its junior members, however, one missing link among this wide range of programs is support for the junior professors, early career researchers and practitioners. Junior researchers face significant amount of pressure and are often overwhelmed by the drastic change from being a student (or a postdoc). Many junior researchers have little training in project management, grant-writing, mentoring, teaching, and establishing a research agenda. As a result, they struggle maintaining a work-life balance and have few (if no) outlet in seeking help, advice, or support. Attendees will have the opportunity to meet fellow early career researchers, participate in peer mentoring, and as a result build a social network (or a cohort) that will continue to support beyond the VIS conference.

Organizers: Kristi Potter, Remco Chang

Meetups: Junior Faculty, Researchers, and Practitioners Happy Hour

Vis researchers to gather and discuss challenges faced in and out of the work environment. The VIS community has always been very supportive of its junior members, however, one missing link among this wide range of programs is support for the junior professors, early career researchers and practitioners. Junior researchers face significant amount of pressure and are often overwhelmed by the drastic change from being a student (or a postdoc). Many junior researchers have little training in project management, grant-writing, mentoring, teaching, and establishing a research agenda. As a result, they struggle maintaining a work-life balance and have few (if no) outlet in seeking help, advice, or support. Attendees will have the opportunity to meet fellow early career researchers, participate in peer mentoring, and as a result build a social network (or a cohort) that will continue to support beyond the VIS conference.

Organizers: Kristi Potter, Remco Chang
[T] A Visual Analytics Framework for Identifying Topic Drivers in Media, Yafeng Lu, Hong Wang, Steven Landis, Ross Maciejewski

[T] Visualizing a Thinker's Life, Patrick Riehmann, Dora Kiesel, Martin Kohlhaas, Bernd Fröhlich

VISAP: Arts Program

Session 1: Arts and Society
Chair: Jeremy Boy

Paper: Seeking New Ways to Visually Represent Uncertainty in Data, Aaron Hill, Clare Churchouse, Michael Schober

Annotated Project: Process of Simulating Tree Rings for Immigration in the U.S., Pedro Cruz, John Wihbey, Avni Ghael, Steve Costa, Ruan Chao, Felipe Shibuya

Paper: Art, Affect and Color: Creating Engaging Expressive Scientific Visualizations, Francesca Samsel, Lyn Bartram, Annie Bares

Annotated Project: Designing Beautiful Evidence in an Era of Complexity—When Graphics Reveal Social Changes and Issues, David Bihanic

Various Artist Talks

10:40–11:00 AM
Coffee Break

11:00 AM–12:40 PM

VAST Papers

AP Applications
Chair: Jörn Kohlhammer


[J] BitExTract: Interactive Visualization for Extracting Bitcoin Exchange Intelligence, Xuanwu Yue, Xinhuan Shu, Xinyu ZHU, Xinnan Du, Zheqing Yu, Dimitrios Papadopoulos, Siyuan Liu


[T] Precision Risk Analysis of Cancer Therapy with Interactive Nomograms and Survival Plots, G. Elisabeta Marai, Chihua Ma, Andrew T. Burks, Filippo Pellolio, Guadalupe Canahuate, David M. Vock, Abdallah S. Mohamed, C. David Fuller

[C] VUSphere: Visual Analysis of Online Distance Education, Huan He, Qinghua Zheng, Bo Dong

InfoVis Papers

Graphs & Trees
Chair: Yingcai Wu

[J] Juniper: A Tree+Table Approach to Multivariate Graph Visualization, Carolina Nobre, Marc Streit, Alexander Lex

[T] Graph Thumbnails: Identifying and Comparing Multiple Graphs at a Glance, Vahan Yoghourdjian, Tim Dwyer, Karsten Klein, Kim Marriott, Michael Wybrow

[J] Structure-Based Suggestive Exploration: A New Approach for Effective Exploration of Large Networks, Fangzhou Guo, Wei Chen, Dongming Han, Jiacheng Pan, Xiaotao Nie, Jiazhi Xia, Xiaolong (Luke) Zhang

[J] Structure-aware Fisheye Views for Efficient Large Graph Exploration, Yunhai Wang, Yanyan Wang, Yinqi Sun, Haiheng Zhang, Chi-Wing Fu, Michael Sedlmair, Baoquan Chen, Oliver Deussen


SciVis Papers

Volume Visualization
Chair: Timo Ropinks

[J] Interactive Obstruction-free Lensing for Volumetric Data Visualization, Michael Traoré, Christophe Hurter, Alexandru Telea

[J] Dynamic Volume Lines: Visual Comparison of 3D Volumes through Space-filling Curves, Johannes Weissenböck, Bernhard Fröhler, Eduard Gröller, Johann Kastner, Christoph Heinzl

[J] A Declarative Grammar of Flexible Volume Visualization Pipelines, Min Shih, Charles Rozhon, Kwan-Liu Ma

[T] Multi-Material Volume Rendering with a Physically-Based Surface Reflection Model, Oleg Igouchkine, Yubo Zhang, Kwan-Liu Ma

[T] A Generative Model for Volume Rendering, Matthew Berger, Jixian Li, Joshua A. Levine

InfoVis Papers

UX Devices: Small & Large
Chair: Wesley Willet

[J] Vistrates: A Component Model for Ubiquitous Analytics, Sriram Karthik Badam, Andreas Mathisen, Roman Rädle, Clemens Nylandstedt Klok, Niklas Elmqvist

[J] SmartCues: A Multitouch Query Approach for Details-on-Demand through Dynamically Computed Overlays, Hariharan Subramonyam, Eytan Adar

[J] Multiple Coordinated Views at Large Displays for Multiple Users: Empirical Findings on User Behavior, Movements, and Distances, Ricardo Langner, Ulrike Kister, Raimund Dachselt

[J] Visualizing Ranges over Time on Mobile Phones: A Task-Based Crowdsourced Evaluation, Matthew Brehmer, Bongshin Lee, Petra Isenberg, Eun Young Choi


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InfoVis Papers

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CG&A Papers

Session 1
Chair: Theresa-Marie Rhyne

Physical Visualization of Geospatial Datasets, Hessam Djavaherpour, Ali Mahdavi-Amiri, Faramarz F. Samavati

Typology of Uncertainty in Static Geolocated Graphs for Visualization, Tatiana von Landesberger, Sebastian Bremm, Marcel Wunderlich

Impact of Spatial Scales on the Intercomparison of Climate Scenarios, Wei Luo, Michael Steptoe, Zheng Chang, Robert Link, Leon Clarke, Ross Maciejewski


Name Profiler Toolkit, Feng Wang, Brett Hansen, Ryan Simmons, Ross Maciejewski

CG&A Papers

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Name Profiler Toolkit, Feng Wang, Brett Hansen, Ryan Simmons, Ross Maciejewski

12:40–2:20 PM
Lunch Break
1:00–2:20 PM

Convention Hall 1, Section C

Open Discussion Session: Restructuring IEEE VIS for the Future
Organizers: Hans Hagen, Daniel Keim, Tamara Munzner, Stephen North, Hanspeter Pfister
Please join us! For more information, please see p. 9.

2:20–4:00 PM

Convention Hall 1, Section C

VAST Papers
LS S High Dimensional Data
Chair: Cagatay Turkay
[J] SIRIUS: Dual, Symmetric, Interactive Dimension Reductions, Michelle Dowling, John Wenskovitch, J.T. Fry, Leanna House, Scotland Leman, Chris North
[T] A Perception-Driven Approach to Supervised Dimensionality Reduction for Visualization, Yunhai Wang, Kang Feng, Xiaowei Chu, Jian Zhang, Chi-Wing Fu, Michael Seldmair, Xiaohui Yu, Baoquan Chen
[C] SMARTexplore: Simplifying High-Dimensional Data Analysis through a Table-Based Visual Analytics Approach, Michael Blumenschein, Michael Behrisch, Stefanie Schmid, Simon Butscher, Deborah R. Wahl, Karoline Villinger, Britta Renner, Harald Reiterer, Daniel Keim
[T] ColorMapND: A Data-Driven Approach and Tool for Mapping Multivariate Data to Color, Shenghui Cheng, Wei Xu, Klaus Mueller
[C] EmbeddingVis: A Visual Analytics Approach to Comparative Network Embedding Inspection, Quan Li, Kristanto Sean Njotoprawiro, Hammad Haleem, Qiaoan Chen, Chris YI, Xiaojuan Man

InfoVis Papers
AP Text & Communication
Chair: Shixia Liu
[J] Evaluating ‘Graphical Perception’ with CNNs, Daniel Haehn, James Tompkin, Hanspeter Pfister
[J] NLIZE: A Perturbation-Driven Visual Interrogation Tool for Analyzing and Interpreting Natural Language Inference Models, Shusen Liu, Zhimin Li, Tao Li, Vivek Srikumar, Valerio Pascucci, Peer-Timo Bremer
[J] Augmenting Visualizations with Interactive Data Facts to Facilitate Interpretation and Communication, Arjun Srinivasan, Steven Drucker, Alex Endert, John Stasko
[J] What Do We Talk About When We Talk About Dashboards?, Alper Sarikaya, Michael Correll, Lyn Bartram, Melanie Tory, Danyel A. Fisher

SciVis Papers
SS Space and Physics
Chair: Jens Krüger
[J] Interactive 3D Visual Analysis of Atmospheric Fronts, Michael Alexander Kern, Timothy David Hewson, Andreas Schäffler, Rüdiger Westermann, Marc Rautenhaus

2:30–4:00 PM

Room 30310

Meetups: Inviwo
Organizers: Timo Ropinski
During the meetup users and developers of the Inviwo visualization framework (www.inviwo.org) will meet and discuss latest developments.

4:00–4:20 PM

Coffee Break

4:20–5:20 PM

Estrel Hall A+B

VIS Fast Forward (Thu & Fri Sessions)

5:20–7:00 PM

Foyers

Posters + Networking + Hiring events

7:00–9:00 PM

Convention Hall 1, Section C+D

VIS Dinner Banquet

[J] An Interactive Framework for Visualization of Weather Forecast Ensembles, Bo Ma, Alireza Entezari
[T] Animation Plans for Before-And-After Satellite images, Maria-Jesús Lobo, Caroline Appert, Emmanuel Pietriga

Estrel Hall C

SciVis Contest
SSS The visualization and analysis of deep water asteroid impacts
Chair: John Patchett, Thomas Wischgoll
Asteroids of various sizes, speeds, and compositions are zipping around the solar system with potential future Earth engagements. Most of the earth is covered in ocean and impacts would likely occur in deep ocean water. The IEEE SciVis Contest 2018 is dedicated to the visualization and analysis of simulations designed to study asteroid impacts in deep ocean water.

Room IV

VIS Panel
Perspectives in Color Research for Scientific Visualization: Understanding the Lenses and Languages
Panelists: Francesca Samsel, Roxana Bujack, Lyn Bartram, Karen Schloss, Gerik Scheuermann
To date most of the design, construction, and evaluation of color-maps and tools have been developed within individual disciplines. Our panelists bring expertise that originates outside of computer science disciplines onto the visualization challenges. Each panelist will introduce their field, expertise, and its potential to contribute to scientific visualization. The panel has been designed to address our broader goals: highlighting a range of expertise beyond computer science; creating language toward common terminology to facilitate dialogue; listening to and understanding the domain sciences needs; and identifying opportunities for collaborative research avenues.
9:00–10:40 AM

**Conventional Hall 1, Section C**

**VAST Papers**

**Security, Privacy, and Anomaly**

Chair: Nan Cao


[J] Situ: Identifying and explaining suspicious behavior in networks, John Goodall, Eric Ragan, Chad Steed, Joel Reed, Gregory Richardson, Kelly Huffer, Robert Bridges, Jason Laska

[Honorable Mention] [J] A Visual Analytics Framework for the Detection of Anomalous Call Stack Trees in High Performance Computing Applications, Cong Xie, Wei Xu, Klaus Mueller

**InfoVis Papers**

**UX Immersive Analytics**

Chair: Jagoda Walny

[J] Origin-Destination Flow Maps in Immersive Environments, Yalong Yang, Tim Dwyer, Bernhard Jenny, Kim Marriott, Maxime Cordeil, Haohui Chen


[J] DXR: A Toolkit for Building Immersive Data Visualizations, Ronell Sicat, Jiabao Li, JunYoung Choi, Maxime Cordeil, Won-Ki Jeong, Benjamin Bach, Hanspeter Pfister

[J] Information Olfactation: Harnessing Scent to Convey Data, Biswaksen Patnaik, Andrea Batch, Niklas Elmqvist


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**SciVis Papers**

**Tensors**

Chair: Ingrid Hotz

[J] Robust and Fast Extraction of 3D Symmetric Tensor Field Topology, Lawrence Roy, Prashant Kumar, Yue Zhang, Eugene Zhang

[J] DT-MRI Streamsurfaces Revisited, Michael Ankele, Thomas Schultz


[T] Tensor Decompositions for Integral Histogram Compression and Look-Up, Rafael Ballester-Ripoll, Renato Pajarola

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**Estrel Hall A+B**

**Coffee Break**

10:40–11:00 AM

10:40–11:40 AM

**Room 30310**

**Meetups: Building an Inclusive VIS Community**

Organizers: Michelle Borkin, Kelly Gaither, R. Jordan Crouser, Meg Pirring

Diversity of perspective is the key to innovation, but ensuring equal access requires concrete action. To this end, the members of the IEEE VIS 2018 Inclusivity & Diversity Committee invite you to this community forum to connect, share your experiences, and explore what it means to build an inclusive VIS community. To learn more about Inclusivity & Diversity at VIS and its current initiatives, please visit: http://ieeevis.org/year/2018/info/inclusion-and-diversity/inclusivity

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11:00 AM–12:40 PM

**Conventional Hall 1, Section C**

**VAST Papers**

**Interactive Analytics and Design**

Chair: Adam Perer

[J] An Interactive Method to Improve Crowdsourced Annotations, Changjian Chen, Shixia Liu, Yafeng Lu, Fangxin Ouyang, Bin Wang


[J] Drag and Track: A Direct Manipulation Interface for Contextualizing Data Instances within a Continuous Parameter Space, Daniel Orban, Daniel Keefe, Ayan Biswas, James Ahrens, David Rogers

[J] Clustrophile 2: Guided Visual Clustering Analysis, Marco Cavallo, Çağatay Demiralp

[J] InkPlanner: Supporting Prewriting via Intelligent Visual Diagramming, Zhicong Lu, Mingming Fan, Yun Wang, Jian Zhao, Michelle Annett, Daniel Wigdor
**InfoVis Papers**

**UX Interaction**
Chair: Manuela Waldner

**[Honorable Mention]** [J] Charticulator: Interactive Construction of Bespoke Chart Layouts, Donghao Ren, Bongshin Lee, Matthew Brehmer

**[J]** Embedded Merge & Split: Visual Adjustment of Data Grouping, Ali Sarvghad, Bahador Saket, Alex Endert, Nadir Weibel

**[T]** Smart Brushing for Parallel Coordinates, Richard Roberts, Robert S. Laramee, Gary A Smith, Paul Brooks, Tony D’Crueze


**InfoVis Papers**

**CSC.SCA** Scalable Techniques


**[Honorable Mention]** [J] RethinVis: Visual Analytics with Interpretable and Interactive Recurrent Neural Network on Electronic Medical Records, Bum Chul Kwon, Min-Je Choi, Joanne Kim, Edward Choi, Young Bin Kim, Soonwook Kwon, Jimeng Sun, Jaegul Choo

**[J]** Charticulator: Interactive Construction of Spatial Layouts, Minsuk Kahng, Nikhil Thorat, Duen Horng Chau, Fernanda Viegas, Martin Wattenberg

**[T]** A Scalable Hybrid Scheme for Ray-Casting of Unstructured Tetrahedral Meshes and Curvilinear Grids, Mohammed, Marco Agus, Ali K. Al-Awami, Hanspeter Pfister, Markus Hadwiger

**[T]** CPU Iso-surface Ray Tracing of Adaptive Mesh Refinement Data, Feng Wang, Ingo Wald, Qi Wu, Will Usher, Chris R. Johnson

**[T]** Efficient Local Statistical Analysis via Point-Wise Histograms in Tetrahedral Meshes and Curvilinear Grids, Bo Zhou, Yi-Jen Chiang, Cong Wang

**[T]** Shadow Accrual Maps: Efficient Accumulation of City-Scale Shadows over Time, Fabio Miranda, Harish Doraishwamy, Marcos Lage, Luc Wilson, Mondrian Hsieh, Cláudio T. Silva

**[T]** A Scalable Hybrid Scheme for Ray-Casting of Unstructured Volume Data, Roba Binyahib, Tom Peterka, Matthew Larsen, Kwan-Liu Ma, Han Childs

**InfoVis Papers**

**Design & Storytelling**
Chair: Jessica Hullman

**[J]** A Framework for Creative Visualization-Opportunities Workshops, Ethan Kerzner, Sarah Goodwin, Jason Dykes, Sara V. Jones, Miria Meyer

**[T]** ATOM: A Grammar for Unit Visualizations, Miriah Meyer, Ethan Kerzner, Alexander Kachkaev, Jason Dykes


**SciVis Papers**

**[SS] Scalable Techniques**
Chair: Steffen Fey


**[T]** A Visual Analytics Framework for Spatiotemporal Trade Network Analysis, YanHong Wu, Rahul Basole, Rahul Basole, Qinwen Wang, Zhen Li, Siwei Fu, Weiwei Chen, Huaijun Qu

**[T]** Exploration Strategies for Discovery of Interactivity in Visualizations, Tanja Blascheck, Lindsay MacDonald Vermeulen, Jo Vermeulen, Charles Perin, Wesley Willett, Thomas Ertl, Sheelagh Carpendale

**CG&A Papers**

**[SS] UX Session 2**
Chair: Gerik Scheuermann

**OpenSpace**

**[J]** A Semantic-based Method for Visualizing Large Image Collections, Qianwen Wang, Zhen Li, Siwei Fu, Weiwei Cui, Huamin Qu


**Belle2VR: A Virtual-Reality Visualization of Subatomic Particle Physics in the Belle II Experiment**, Zach Duer, Leo Pilonen, George Glasson

**Application-Driven Design: Help Students Understand Employment and See the “Big Picture”,** Li Liu, Deborah Silver, Karen Bemis

**Management of Cerebral Aneurysm Descriptors based on an Automatic Ostium Extraction,** Monique Meuschke, Tobias Günther, Ralph Wickenhöfer, Markus Gross, Bernhard Preim, Kai Lawonn

**Belle2VR: A Virtual-Reality Visualization of Subatomic Particle Physics in the Belle II Experiment**, Zach Duer, Leo Pilonen, George Glasson

**[J]** Mapping Color to Meaning in Colormap Collections, Karen B. Schloss, Connor C. Gramazio, Allison T. Silverman, Madeline L. Parker, Audrey S. Wang


**[J]** Embedded Merge & Split: Visual Adjustment of Data Grouping, Ali Sarvghad, Bahador Saket, Alex Endert, Nadir Weibel

**[T]** Smart Brushing for Parallel Coordinates, Richard Roberts, Robert S. Laramee, Gary A Smith, Paul Brooks, Tony D’Crueze


**[Honorable Mention]** [J] Design Exposition with Literate Visualization, Jo Wood, Alexander Kachkaev, Jason Dykes

**[J]** Narris: Authoring Narrative Slideshows for Introducing Data Visualization Designs, Qianwen Wang, Zhen Li, Siwei Fu, Weiwei Cui, Huamin Qu

**[Honorable Mention]** [J] Design Exposition with Literate Visualization, Jo Wood, Alexander Kachkaev, Jason Dykes

**[C]** Analyzing the Noise Robustness of Deep Neural Networks, Mengchen Liu, Shixia Liu, Hang Su, Kelei Cao, Jun Zhu

**[J]** RetainVis: Visual Analytics with Interpretable and Interactive Recurrent Neural Network on Electronic Medical Records, Bum Chul Kwon, Min-Je Choi, Joanne Kim, Edward Choi, Young Bin Kim, Soonwook Kwon, Jimeng Sun, Jaegul Choo

**[J]** Charticulator: Interactive Construction of Spatial Layouts, Minsuk Kahng, Nikhil Thorat, Duen Horng Chau, Fernanda Viegas, Martin Wattenberg

**Coring**


**[T]** A Semantic-based Method for Visualizing Large Image Collections, Xiao Xie, Xiwen Cai, Junpei Zhou, Nan Cao, Yingcai Wu

**[T]** PhotoRecomposer: Interactive Photo Recomposition by Cropping, Yuan Liang, Xiting Wang, Song-Hai Zhang, Shi-Min Hu, Shixia Liu

**[C]** Analyzing the Noise Robustness of Deep Neural Networks, Mengchen Liu, Shixia Liu, Hang Su, Kelei Cao, Jun Zhu


**[J]** RetainVis: Visual Analytics with Interpretable and Interactive Recurrent Neural Network on Electronic Medical Records, Bum Chul Kwon, Min-Je Choi, Joanne Kim, Edward Choi, Young Bin Kim, Soonwook Kwon, Jimeng Sun, Jaegul Choo

**[J]** Charticulator: Interactive Construction of Spatial Layouts, Minsuk Kahng, Nikhil Thorat, Duen Horng Chau, Fernanda Viegas, Martin Wattenberg
Meetups: VIS Job-Fair Meetup
Organizers: Anastasia Bezerianos, Jonathan Woodring, Weiwei Cui
As a complement to the Asynchronous Job Fair, we are organizing a job “speed-dating” meetup. Its goal is to bring together job seekers and employers in one venue to trade CV and employment information. Both job seekers and employers should attend with the expectation to be prepared with “low-tech” information, such as paper and flyers to exchange. If you are an interested job seeker, please bring your contact information to share, such as printed CVs, email addresses on notecards or business cards, for example. Likewise for employers, please be prepared with business cards, brochure, and other paper-based information.

4:20–6:00 PM

VisPapers

VAST Papers
Explainable ML
Chair: Jaegul Choo


[Honorable Mention] [1] Seq2Seq-Vis: A Visual Debugging Tool for Sequence to Sequence Models, Hendrik Stroebelt, Sebastian Gehrmann, Michael Behrisch, Adam Perer, Hanspeter Pfister, Alexander M. Rush


[1] Visual Analytics for Topic Model Optimization Based on User-Steerable Speculative Execution, Mennatallah El-Assady, Fabian Sperle, Oliver Deussen, Daniel Keim, Christopher Collins

[1] VIS4ML: An Ontology for Visual Analytics Assisted Machine Learning, Dominik Sacha, Matthias Kraus, Daniel Keim, Min Chen

InfoVis Papers

Perception & Cognition 2
Chair: Karen Schloss

[1] Mitigating the Attraction Effect with Visualizations, Evanthia Dimara, Gilles Bailly, Anastasia Bezerianos, Steven Franconeri

[1] Face to Face: Evaluating Visual Comparison, Brian David Ondov, Bahador Saket, Alex Endert, Çağatay Demiralp

[1] Task-Based Effectiveness of Basic Visualizations, Bahador Saket, Alex Endert, Çağatay Demiralp

[1] At a Glance: Approximate Entropy as a Measure of Line Chart Visualization Complexity, Eugene Wu, Remco Chang, Abigail Mosca, Gabriel Ryan

[1] Correlation Judgment and Visualization Features: A Comparative Study, Fumeng Yang, Lane Harrison, Ronald A. Rensink, Steven Franconeri, Remco Chang

SciVis Papers

Topology, Geometry, and Precision
Chairs: Bei Wang

[1] Persistence Atlas for Critical Point Variability in Ensembles, Guillaume Favelier, Noura Faraj, Brian Summa, Julien Tierny

[1] Probabilistic Asymptotic Decider for Topological Ambiguity Resolution in Level-Set Extraction for Uncertain 2D Data, Tushar Athawale, Chris R. Johnson

[1] Hexahedral Mesh Structure Visualization and Evaluation, Koaji Cotrik Xu, Guoning Chen

[1] Shared-Memory Parallel Computation of Morse-Smale Complexes with Improved Accuracy, Attila Gyulassy, Peer-Timo Bremer, Valerio Pascucci

[1] A Study of the Trade-off between Reduced Precision and Resolution for Scientific Data Analysis and Visualization, Duong Hoang, Pavol Klacansky, Harsh Bhatia, Peer-Timo Bremer, Peter Lindstrom, Valerio Pascucci

SciVis Short Papers

Visual Abstractions, Perceptual Study and Immersive Visualization
Chairs: João L. D. Comba


VAPLI: Novel Visual Abstraction for Protein-Lipid Interactions, Naif Alharbi, Matthieu Chavent, Michael Krone, Robert S. Laramee

Color Interpolation for Non-Euclidean Color Spaces, Max Zeyen, Tobias Post, Hans Hagen, James Ahrens, David Rogers, Roxana Bujack

VRGE: An Immersive Visualization Application for the Geosciences, David A. B. Hyde, Tyler R. Hall, Jef Caers

3D Interactive Lenses for Visualization in Virtual Environments, Roberta C. R. Mota, Allan Rocha, Julio D. Silva, Usman R. Alim, Ehud Sharlin

Toward A Deep Understanding of What Makes a Scientific Visualization Memorable, Rui Li, Jian Chen

Ordering Perceptions about Perceptual Order, Roxana Bujack, Terece L. Turton, David Rogers, James Ahrens

QuFlow: Visualizing Parameter Flow in Quantum Circuits for Understanding Quantum Computation, Siyuan Lin, Hao Jiang, Lingyun Sun

AP Meet the Founders: How to Start and Sustain a Business in the Visualization Space
Panelists: Robert Kosara, Lisa Avila, Jeffrey Heer, Anders Ynnerman
Visualization is not just an academic pursuit, there are also a number of successful companies that have come out of visualization research or are closely related. This panel brings together some of the founders of these companies to discuss how to start a small business based on research and how to sustain and keep building it as a business. We will talk about what were good and bad decisions, what was easier and harder than expected, and be open to questions from anybody who might be considering starting their own business (or is just curious).

4:00–4:20 PM
Coffee Break

4:10–6:00 PM

Room IV

4:20–6:00 PM

Convention Hall 1, Section C

VAST Papers

Explainable ML
Chair: Jaegul Choo


[Honorable Mention] [1] Seq2Seq-Vis: A Visual Debugging Tool for Sequence to Sequence Models, Hendrik Stroebelt, Sebastian Gehrmann, Michael Behrisch, Adam Perer, Hanspeter Pfister, Alexander M. Rush


[1] Visual Analytics for Topic Model Optimization Based on User-Steerable Speculative Execution, Mennatallah El-Assady, Fabian Sperle, Oliver Deussen, Daniel Keim, Christopher Collins

[1] VVIS4ML: An Ontology for Visual Analytics Assisted Machine Learning, Dominik Sacha, Matthias Kraus, Daniel Keim, Min Chen

InfoVis Papers

Perception & Cognition 2
Chair: Karen Schloss

[1] Mitigating the Attraction Effect with Visualizations, Evanthia Dimara, Gilles Bailly, Anastasia Bezerianos, Steven Franconeri

[1] Face to Face: Evaluating Visual Comparison, Brian David Ondov, Bahador Saket, Alex Endert, Çağatay Demiralp

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[1] At a Glance: Approximate Entropy as a Measure of Line Chart Visualization Complexity, Eugene Wu, Remco Chang, Abigail Mosca, Gabriel Ryan

[1] Correlation Judgment and Visualization Features: A Comparative Study, Fumeng Yang, Lane Harrison, Ronald A. Rensink, Steven Franconeri, Remco Chang
SciVis Papers

**Interaction and Multivariate Data**
Chairs: Luis Gustavo Nonato

**[Honorable Mention]** [J] Firefly: Illumination Drones for Interactive Visualization, Sergej Stoppel, Magnus Paulson Erga, Stefan Bruckner

[J] CoDDA: A Flexible Copula-based Distribution Driven Analysis Framework for Large-Scale Multivariate Data, Subhashis Hazarika, Soumya Dutta, Han-Wei Shen, Jen-Ping Chen

[J] Details-First, Show Context, Overview Last: Supporting Exploration of Viscous Fingers in Large-Scale Ensemble Simulations, Timothy Basil Luciani, Andrew T Burks, Cassiano Sugiyama, Jonathan Komperda, G. Elisabetta Marai

[T] A Model of Spatial Directness in Interactive Visualization, Stefan Bruckner, Tobias Isenberg, Timo Ropinski, Alexander Wiebel

[T] Decal-Lenses: Interactive Lenses on Surfaces for Multivariate Visualization, Allan Rocha, Julio Daniel Silva, Usman R. Alim, Sheelagh Carpendale, Mario Costa Sousa

SciVis Short Papers

**Flow, Astrophysics, and Computationally Intensive Data Visualization**
Chairs: Joshua Levine

Cluster-Based Visualization for Merger Tree Data: The Challenge of Missing Expectations, Annie Preston, Kwan-Liu Ma

Visualization of Uncertainty for Computationally Intensive Simulations Using High Fidelity Emulators, Ayan Biswas, Earl Lawrence, James Ahrens


FTLE Ridge Lines for Long Integration Times, Thomas Wilde, Christian Rössl, Holger Theisel

Ocean Current Segmentation at Different Depths and Correlation with Temperature in a MPAS-Ocean Simulation, Petra Gospodnetic, Divya Banesh, Philip Wolfram, Mark Petersen, Hans Hagen, James Ahrens, Markus Rauhut

TimeTubes: Automatic Extraction of Observable Blazar Features from Long-Term, Multi-Dimensional Datasets, Naoko Sawada, Masanori Nakayama, Makoto Uemura, Issei Fujishiro


Biclusters based Visual Exploration of Multivariate Scientific Data, Xiangyang He, Yubo Tao, Qirui Wang, Hai Lin

6:00–7:00 PM

**Meetups: Visualization Meets Vision Science**
Organizers: Madison Elliott, Zoya Bylinskii, Christine Nothelfer, Cindy Xiong, Danielle Albers Szafir

Vision science provides both an empirical basis for techniques and design practices in visualization and a suite of methods and approaches for understanding visualizations—including what data trends people see, what statistics they extract, and what they ultimately remember. Visualization provides a real world platform for vision scientists to investigate how our perceptual and cognitive systems interpret visualized information and problems for understanding how we transform visual information to knowledge. Come meet with visualization and vision science experts to share cutting edge research at this growing interdisciplinary intersection! We will engage in lightning talks and open discussion, which provide an opportunity to ask questions, share new research ideas, and extend your professional networks. All are welcome, and interested presenters can submit an abstract for a 2-3 minute “lightning talk” about their latest work by September 21, 2018.

**Meetups: Good Food Meets Good Science**
Organizers: Daniel Archambault, Andreas Kerren

Tired of bad food? Didn’t have something local when attending the conference and regretted it? Want the good scientific discussion and communication with the meetup participants through a Slack channel.

6:15–7:00 PM

7:00 PM
9:00–10:40 AM

Convention Hall 1, Section C

VAST Papers

**DS Event, Sequence, and ML**  
Chair: Carlos Scheidegger

[J] MAQUI: Interweaving Queries and Pattern Mining for Recursive Event Sequence Exploration, Po-Ming Law, Zhicheng Liu, Sana Malik, Rahul Basole

[J] iForest: Interpreting Random Forests via Visual Analytics, Xun Zhao, Yanhong Wu, Dik Lun Lee, Weiwei Cui


[T] StreamExplorer: A Multi-Stage System for Visually Exploring Events in Social Streams, Yingcai Wu, Zhutian Chen, Guodao Sun, Xiao Xie, Nan Cao, Shixia Liu, Weiwei Cui


InfoVis Papers

Uncertainty & Error  
Chair: Lace Padilla

[J] Visualizing Uncertain Tropical Cyclone Predictions using Representative Samples from Ensembles of Forecast Tracks, Le Liu, Lace M. K. Padilla, Sarah Creem-Regehr, Donald House

[J] Hypothetical Outcome Plots Help Untrained Observers Judge Trends in Ambiguous Data, Alex Kale, Francis Nguyen, Matthew Kay, Jessica Hullman


10:40–11:00 AM  

Coffee Break

11:00–12:00 PM

Convention Hall 1, Section C

AP VIS Capstone

Speaker: Joachim M. Buhmann, ETH Zurich  
Can I Believe What I See?—Information-Theoretic Algorithm Validation

Please see p. 5 for Capstone details.

12:00–12:30 PM

Convention Hall 1, Section C

AP VIS Closing

VIS 2018 General Chair: Holger Theisel, University of Magdeburg  
VIS 2019 General Chair: Brian Fisher, Simon Fraser University

12:30 AM – 12:30 PM

Estrel Hall C

SciVis Papers

**SS Time-Varying Data**  
Chair: Steffen Oeltze-Jafra


[T] Popup-Plots: Warping Temporal Data Visualization, Johanna Schmidt, Dominik Fleischmann, Bernhard Preim, Norbert Brandle, Gabriel Mistelbauer

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 and SciVis Short Papers tracks feature additional papers with innovative advances and applications in visual analytics and in scientific visualization that may have focus 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.
POSTERS & CONTESTS

**VIS Posters**

Health Visualizations at Home: Who Sees What Where, Bon Adriel Aseniero, Anthony Tang, Sheelagh Carpendale

A Multi-View Image-Based Volume Visualization Technique, Salaheddin Alakkari, John Dingliana

Situated Visualizations of Office Noise to Promote Personal Health, Mina Alipour, Pierre Dragicic, Tobias Isenberg, Petra Isenberg

Study of Multiple View Layout Strategies in Visualization, Hayder M. Al-maneea, Jonathan C. Roberts

Effects of Declinism and Distinction Biases on Data Visualization, Hasan Alp Boz, Rafiye Kaceci, Yasemin Vasaroglu, Selim Balcisoy

An Interactive Tool for Feature Analysis of Outliers in Multi-Dimensional Data, Kentaro Asai, Tsukasa Fukusato, Takeo Igarashi

Multi-Dimensional Projections Explorer: Searching through Techniques, Quality Measures, Analytic Tasks, and Layout Enrichments, Michael Aupetit, Mosammat Samiha Sadeka, Ali Sajjad, Luis Gustavo Nonato

Zooming on Tokens: Seamless Display Modes for Annotation Analysis, Martin Baumann, Steffen Koch, Harutyun Minasyan, Thomas Ertl

Refolding the Earth: Interactive Myriahedral Projection and Fabrication, Nicolas Belmonte, Yang Wang

[Intorable Mention] Integrated Visualization of Structure and Attribute Similarity of Multivariate Graphs, Philip Berger, Mohammad Chegini, Heidrun Schumann, Christian Tominski

Mure.js: Toward Flexible Authoring and Reshaping of Networks, Alex Bigelow, Carolina Nobre, Alexander Lex, Miriah Meyer

Scaling Up Parallel Coordinate Plot with Color-coded Stacked Histograms, Jinwook Bok, Bohyoung Kim, Jinwook Seo

Dual View: Multivariate Visualization Using Linked Dimensions of Objects and Layouts, David Borland, David Gotz

Towards a Framework for Immersive Analytics on the Web, Peter W. S. Butler, Nigel W. John, Panagiotis D. Ritsos

t-viSNE: A Visual Inspector for the Exploration of t-SNE, Angelos Chatzimparmpas, Rafael M. Martins, Andreas Kerren

Designing Narrative Slideshows for Learning Analytics, Qing Chen, Zhen Li, Ting-Chuen Pong, Huamin Qu

Bridging the Gap between Visual Analytics and Storytelling: General Framework and Application to Social Media Data, Siming Chen, Jie Lue, Gennady Andrienko, Natalia Andrienko, Phong H. Nguyen, Catagaty Turkay

HCT: A Visual Analysis Method for Tree Comparison Based on Circular Treemap, Yi Chen, Yue Li, Cheng Lv

Towards Concept-Driven Visual Analytics, In Kwon Choi, Swati Mishra, Kyle Harris, Nirmal Kumar Raveendranath, Taylor Childers, Khairi Reda

Creating Explorable Visualization Design Spaces for Domain Experts: An Example from Infectious Disease Genomic Epidemiology, Anamaria Crisan, Jennifer L. Gardy, Tamara Munzner

Visual Querying and Exploring of Large Multilayer Graphs, Erick Cuenca, Arnaud Sallaberry, Dino Ienco, Pascal Poncelet

Arctic Movement: Visualization of a Photographic Collection, Katherine Currier, Sheelagh Carpendale

ComVisMD-A Visualization Tool for Compact Display of Multidimensional Data: An Illustration on Cricket Players Data, Shridhar B. Dandin, Mireille Ducassé

Privacy Protected Thematic Maps, Edwin de Jonge, Peter-Paul de Wolf

ConfusionFlow: Visualizing Neural Network Confusion Across Epochs, Martin Ennemoser, Peter Ruch, Holger Stitz, Hendrik Strobelt, Marc Streit

Combining Multiple View Components for Exploratory Visualization, Vladimir Guchev, Paolo Buono, Cristina Gena

BubbleUp: Toward Better Analysis for Temporal Event Data, Wenjun Guo, Seungwook Kim, Seongmin Mun, Kyungwon Lee

A Visualization Tool for Intellectual Property Law Research in China, Jin Han, Jingyi Zhu, Ling Ma, Bindu Chib

Comparing Rendering Performance of Common Web Technologies for Large Graphs, Tom Horak, Ulrike Kister, Raimund Dachselt

Simultaneous Wolds: Using Physical Models to Contextualize and Compose Visualizations, Carmen Hull, Sheelagh Carpendale, Wesley Willett

A Visual Analytics Framework for Automated Machine Learning, Shah Rukh Humayoun, Dylan Cashman, Florian Heimerl, Remco Chang

Views as Rich Menus for Other Views: A Case Study on Personal Data Visualization, Tina Huyhn, Søren Knudsen, Sheelagh Carpendale

Discovering the Data Mapping of an Unfamiliar Visualization, Lisa Hynes, Tina Huyhn, Sarah Storteboom, Jagoda Walny, Christian Frisson, Doris Kosminsky, Mieka West, Sheelagh Carpendale, Wesley Willett

Creating Small Unit-Based Glyph Visualisations, James R. Jackson, Panagiotis D. Ritsos, Jonathan C. Roberts

Spatial Comparison of Cricketers, Adhitya Kamakshidasan

CLIPPR: Maximally Informative CLIPPed Projections with Bounding Regions, Bo Kang, Dylan Cashman, Remco Chang, Jeffrey Lijffijt, Tijl De Bie

TasteGraph: A Visual Analytics Tool for Profiling Media Audiences’ Tastes, Ahmad Karawash, Sara Diamond, Marcus A. Gordon, Jad Al Rabbaa, Roxolyana Shepko-Hamilton, Greice C. Mariano, Lan-Xi Dong, Afrooz Samaei, Hugh Ritchie

ViaVelox—A System to Visually Analyze GPS-Tracke Bike Rides, Deniz Kaya, Büsra Keles, Dimitry Nagorny, Pascal Perle, Philip Pregler, Lisa Rudolf, Martin Schröder, Ugur Tunali, Till Nagel

Visualizing Learning Experiences Using Conversation Flows, Mandy Keck, Alexander Maasch, Romy Bürger, Rainer Groh

Visual Version Comparison of Multidimensional Data Sets Using Glyphs, Mandy Keck, Dietrich Kammer, Rainer Groh

Improving Barycentric Embeddings of Topic Spaces, Dora Kiesel, Patrick Riehmann, Fan Fan, Yamen Ajjour, Henning Wachsmuth, Benno Stein, Bernd Froehlich

Fostering Data Humanism with DataPortraits: Empowering People to Create a Personalized Visual Vocabulary, Nam Wook Guo, Seungwook Kim, Seongmin Mun, Kyungwon Lee

Virtual Lenses for Immersive Analytics, Sven Kluge, Stefan Gladisch, Uwe Freiherr von Lukas, Christian Tominski
Highlighting Text Regions of Interest with Character-Based LSTM Recurrent Networks, Johannes Novotny, Joshua Tate, Morgan L. Turner, Stephen Gately, Fritz Drury, Peter Fackingham, David H. Laidlaw
MEXPRESS: 2018 Update, Alexander Koch, Tim De Meyer, Jana Jeschke, Wim Van, Manon van
ST Sequence Miner: Visual Event Sequence Pattern Mining with Spatio-temporal Log Data, Baran Koseoglu, Erdem Kaya, Selim Balcişoy
Towards Visual Data Exploration at Wall-Sized Displays by Combining Physical Navigation with Spatially-Aware Devices, Ricardo Langner, Raimund Dachselt
[Honorable Mention] A Scale-Space Filtering Approach for the Multi-Resolution Illustrative Visualization of Multivariate Data, Jenny Hyunjung Lee, Klaus Mueller
[Best Poster] Conveying Uncertainty in Archived War Diaries with GeoBlobs, Johannes Liem, Eirini Goudarouli, Steven Hirschorn, Jo Wood, Charles Perin
Visualizing Attention in Sequence-to-Sequence Summarization Models, Halden Lin, Tongsuho Huang Wu, Kanit Wongsuphasawat, Yejin Choi, Jeffrey Heer
Visualizing Dynamic Networks of Long Sequences with Pixel Matrix Array, Liqing Lin, Liwenhan Xie, Zhuo Zhang, Xiaoru Yuan
[Honorable Mention] Visualizing Time in Temporal Event Sequences, Jessica Magallanes-Castaneda, Lindsey van Gemeren, Steven Wood, Maria-Cruz Villa-Uriol
Perceptually Optimized Color Selection for Visualization, Subhrajyoti Maji, John Dingliana
Assessing Dot-Map Aggregations, Wouter Meulemans, Martijn Tennekes
On Minimum-Displacement Overlap Removal, Wouter Meulemans, Yuri Miyagi, Daniel Weiskopf, Takayuki Itoh
Towards Data Science for the Masses: A Study of Data Scientists and Their Interactions with Clients, Abigail Mosca, Shannon Robinson, Meredith Clarke, Rebecca Redelmeier, Sebastian Coates, Dylan Cashman, Remco Chang
Bonus Miracle Tool: Visual Exploration of Nutrients across the Baltic Sea Region, Carlo Navarra, Tina Neset, Juile Wilk, Alena Bartosova, René Capell
[Best Poster] Developing Virtual Reality Visualizations of Dinosaur Track Creation with Scientific Sketching, Johannes Novotny, Joshua Tate, Morgan L. Turner, Stephen Gately, Fritz Drury, Peter Fackingham, David H. Laidlaw
[Best Poster] CerebroVis: Topology- and Constraint-based Network Layout for the Visualization of Cerebrovascular Arteries, Aditeya Pandey, Harsh Shukla, Geoffrey S. Young, Lei Qin, Cody Dunne, Michelle A. Borkin
GitHub Viz: An Interactive Visualization to Acquire Knowledge from Authoritative Developers, Chanhee Park, Sungjuin Do, Eunjeong Lee, Hanna Jang, Sungchan Jeong, Hyunwoo Han, Kyungwon Lee
Toward an Analysis of Practitioner-Oriented Resources for Visualization Design, Paul Parsons, Ya-Hsin Hung, Ali Bajigelenov
The Symmetry of My Life II, Charles Perin
Personal Patient-Generated Data Visualizations for Diabetes Patients, Fatemeh Rajabiayazi, Charles Perin, Lora Oehlberg, Sheelagh Carpendale
The Voronoi Projection, Philippe Rivière
Composer: Visual Cohort Analysis of Patient Outcomes, Jennifer Rogers, Nicholas Spina, Ashley Neese, Rachel Hess, Darrel Brodke, Alexander Lex
Visualising E-mail Communication to Improve E-discovery, Mithileshy Sathiyanarayanan, Cagatay Turkay, Jason Dykes
EasyPZ.js: A Library for Pan and Zoom Visualizations, Michael Schwab, James Tompkin, Jeff Huang, Michelle A. Borkin
Interactive Visual Tools Supporting Effective Health State Understanding of Patient with Comorbidities, Marek Skokan, Jan Hreno
Characterising Farms by the Movement of Animals through Them, Aidan Slingsby, Andy Paterson, Mark Rigby, Katherine Grace, Phong Nguyen, Charles Perin, Cagatay Turkay, Dalal Aljasem
Towards a Visual Analytics Pipeline for the Analysis of Recurring Patterns in Time Series Data, Florian Spechtenhauser, Rastislav Hronsksy, Torsten Möller, Harald Piringer
[Best Poster] Urban DataSphere: Exploring Immersive Multiview Visualizations in Cities, Maxim Spur, Vincent Tourre
Visual Analysis of Abnormal Thickness of Intraretinal Layers, Jörg Stüwe, Martin Röhlig, Heidrun Schumann, Ruby Kala Prakasam, Oliver Stachs
TopoLines: Topological Smoothing for Line Charts, Ashley Suh, Christopher Salgado, Mustafa Haji, Paul Rosen
Road Accidents in the UK (Analysis and Visualization), Anjul K. Tyagi, Ayush Kumar, Anshul Gandhi, Klaus Mueller
PolyViz - A Visualization System for Special Kind of Multipartite Graphs., Tolga Uslu, Alexander Mehler
Visualizing the Results of Product Costing Plausibility Checks with Parallel Hierarchies, Zana Vosough
Subspace Shapes: Enhancing High-Dimensional Subspace Structures via Ambient Occlusion Shading, Bing Wang, Klaus Mueller
[Honorable Mention] Data Embroidery: Exploring Alternative Mediums for Personal Physicalization, Kendra Wannamaker, Lora Oehlberg, Sheelagh Carpendale, Wesley Willett
[Honorable Mention] Evaluation of Guide Wire Proficiency During a Catheter-based Intervention, Johannes Waschke, Katja Isabel Paul, Peter Lanzer, Mario, Hlawitschka
Manual and Automatic Tree Editing with Applications to Microbiome Time-series Data, Zehua Zeng, Niklas Elmqvist, Catherine Plaisant
Increasing Understanding of Survey Re-Weighting with Visualization, Yuefei Zhang, David Borland, David Gotz
Doctoral Colloquium

Panelists
Anastasia Bezerianos, Fanny Chevalier, Tim Dwyer, Bongshin Lee, Ross Maciejewski, Silvia Miksch, Timo Ropinski, Marc Streit, Jarke van Wijk

Session 1
Visual Analytics for Fraud Detection and Monitoring, Roger A. Leite, TU Wien, Austria

Visual Analytics for Machine In the Loop (VAMIL) Data Analysis, Dylan Cashman, Tufts University, United States

Interactive Visualization of Multidimensional Hierarchical Aggregates with Parallel Hierarchies, Zana Vosough, SAP SE, Germany

Pairwise Visual Comparison of Directed Acyclic Graphs, Kathrin Ballweg, Technische Universität Darmstadt, Germany

Investigating Information Visualization with Children, Fearn Bishop, University of St Andrews, United Kingdom

Investigation into the Viability of the Use of the Assessment of Information Visualisation Literacy as an Aid in the Design of Visualisation Systems for Non-Expert Users, David Concannon, University College London, United Kingdom

Session 2
Visual Analytics Methodologies in Causality Analysis, Hong Wang, Arizona State University, United States

Supporting Visual Analysis for Data Exploration through Exploitable, Zhe Cui, University of Maryland, United States

Visual Storytelling of Big Imaging Data, Lorenzo Amabili, University of Groningen, Netherlands

Stepping Closer To A Science of Interaction: A Paradigm for Studying the Cognitive Mechanisms of Interaction, Amy Fox, University of California San Diego, United States

Session 3
Dimension Reduction and Clustering Algorithm Combinations for Exploratory Data Analysis, John Wenskovitch, Virginia Polytechnic Institute and State University, United States

Bridging the (Visual) Gap for Comprehensive Understanding of Clinical Text, Nicole Sultanum, University of Toronto, Canada

Do We Know Where the Big One Will Strike? Evaluating Uncertainty Visualization Approaches for Earthquake Forecasts, Max Schneider, University of Washington, United States

VAST Challenge
VAST Challenge 2018: Suspense at the Wildlife Preserve, R. Jordan Crouser, Kristin Cook, John Fallon, Jerome Haack, Kristen Liggett, Diane Staheli, Mark A. Whiting


[Mini-Challenge 1 Honorable Mention: Critical Thinking] Visual Bird Watcher: Interactive Visual Analysis on Bird Distribution and Migration, Chuyue Ye, Sihang Li, Gang Li, Liang Tang, Dengfeng Zhang, Xinyue Luan, Zhuo Zhang, Xiaoru Yuan


[Mini-Challenge 2 Award: Elegant Design of an Interactive Display] Identifying Patterns and Anomalies within Spatiotemporal Water Sampling Data, Isabel Piljek, Giuliana Dehn, Jannik Frauendorf, Ziad Salem, Yerzhan Niyazbayev, Juri Buchmüller, Eren Cakmak, Wolfgang Jentner, Florian Stoffel, Daniel A. Keim

[Mini-Challenge 2 Award: Strong Support for Exploratory Analysis] MTDES: Multi-dimensional Temporal Data Exploration System, Vung V. Pham, Tommy Dang

[Mini-Challenge 2 Honorable Mention: Clarity of Narrative] Unearthing the X-Streams: Visualizing Water Contamination, Akangsha Bandalkul, Angad Srivastava, Kishan Bharadwaj Shridhar, Ong Guan Jie Jason, Zhang Yanrong


[Mini-Challenge 3 Award: Insights Generated through Use of a Custom Tool] Visual Analysis for Subgroups in a Dynamic Network, Qi Ma, Xuexi Wei, Liwenhan Xie, Zhiyi Yin, Yiping Liu, Chuanming Huang, Xiaoru Yuan


[Mini-Challenge 1 Interactive Classification Using Spectrograms and Audio Glyphs, Eren Cakmak, Udo Schlegel, Matthias Miller, Juri Buchmüller, Wolfgang Jentner, Daniel A. Keim

[Mini-Challenge 1 They Do Move! Visual Analytics of Rose-Crested Blue Pipit Habitat, Elena Ginina, Michael Beham, Denis Gracanin, Rainer Splechtna, Kresimir Matkovic

[Mini-Challenge 1 PhoenixMap: Spatio-Temporal Distribution Analysis with Deep Learning Classifications, Junhan Zhao, Xiang Liu, Chen Guo, Ryan Guan, Josephine Zhang, Bajijian Yang, Zhenyu Qian, Yingjie Chen

[Mini-Challenge 2 Multilevel Visual Clustering Exploration for Incomplete Time-series in Water Samples, Daniel Alcaide, Jan Aerts

[Mini-Challenge 2 A Unified Approach for Sampling and Measurement Joint Analysis, Pablo Santoro, Rubén Flecha, Juan Pablo Pilorget

[Mini-Challenge 2 Using Tableau to Discover the Effect of Chemical Release at Wildlife Preserve, Bo Sun, Benjamin Weidner, Simon Su

[Mini-Challenge 2 River-water Quality Exploration, Michael Beham, Rainer Splechtna, Denis Gracanin, Elena Ginina, Kresimir Matkovic

[Mini-Challenge 2 ContourMap: Contour based Visualization of Water Chemical Data, Chen Guo, Ryan Guan, Josephine Zhang, Yingjie Victor Chen, Zhenyu Cheryl Qian

[Mini-Challenge 3 Discovering Suspicious Patterns Using a Graph Based Approach, Sirisha Velampalli, Lenin Mookiah, William Eberle

[Mini-Challenge 3 A Visualization Study on Visual Analysis to Explore the Organizational Structure of the Group within a Factory, Bo Sun, Ce Pang
SciVis Contest
[Invited presentation] Deep Water Impacts, Galen Gisler, Robert Weaver


[Honorable Mention] Visualization and Analysis of Deep Water Asteroid Impacts, Raphael Imahorn, Irene Baeza Rojo, Tobias Günther


Preview of 2019 SciVis Contest, Silvio Rizzi

LDAV Posters
Exploring Visualization Techniques with HACC Simulation Data, Joseph Adamo, JD Emberson, Edouard Brooks, Silvio Rizzi, Joseph Insley, Michael E. Papka

In Situ Visualization and Analysis to Design Large Scale Experiments in Computational Fluid Dynamics, Bennett Bernardoni, Nicola Ferrier, Joseph Insley, Michael E. Papka, Saumil Patel, Silvio Rizzi

Citation Network Visualization of Reference Papers Based on Influence Groups, Gyeongcheol Choi, Suhyun Lim, Tae rin Yoon, Kyungwon Lee

Method for Improving RadViz’s Navigation Function Based on Focusing and Filtering, Hyunwoo Han, Tae rin Yoon, Hyoji Ha, Juwon Hong, Kyungwon Lee

Complexity Estimation for Feature Tracking Data, Dirk N. Helmrich, Andrea Schnorr, Torsten W. Kuhlen, Bernd Hentschel

A Comprehensive Informative Metric for Summarizing HPC System Status, Yawei Hui, Byung Hoon Park, Christian Engelmann

Towards In-Situ Vortex Identification for Peta-Scale CFD Using Contour Trees, Marius K. Koch, Paul H. J. Kelly, Peter E. Vincent

A Flow Visualization Using Parallel 3D Line Integral Convolution for Large Scale Unstructured Grid Data, Yangguang Liao

A Large Data Visualization Framework for SPARC64 fx HPC Systems — Case Study: K Computer Operational Environment, Kenji Ono, Naohisa Sakamoto, Kengo Hayashi, Motohiko Matsuda, Fumiyoshi Shoji, Kentaro Oku, Masahiro Fujita, Kazuma Hatta


VizSec Posters
Doing User Behaviour Analytics through Interactive Visual User Profiles, Phong H. Nguyen, Siming Chen, Natalia Andrienko, Gennady Andrienko, Olivier Thonnard, Alysson Bessani, Cagatay Turkay

Designing Visualisation Enhancements for SIEM Systems, Phong H. Nguyen, Siming Chen, Natalia Andrienko, Michael Kamp, Linara Adlova, Gennady Andrienko, Olivier Thonnard, Alysson Bessani, Cagatay Turkay

Visual Content Privacy Leaks on Social Media Networks, Jasmine DeHart, Christian Grant

Email Campaign Explorer for Detecting Malicious Email Campaigns, Awalin Sopan

NetSet: A Set Visualization Tool for Network Metadata Exploration and Threat Hunting, Brett Fouss, Dennis Ross, Shannon Robinson, Kenneth Alperin

Exploring the Role of Experts’ Knowledge in Visualizations for Cyber Security, Fabian Böehm, Noëlle Rakotondravony, Günther Pernul, Hans P. Reiser

Towards Bridging the Gap Between Visual Cybersecurity Analytics and Non-Experts by Means of User Experience Design, Marija Schufrin, Alex Ulmer, David Sessler, Jörn Kohlhammer

Multi-layer Onion-ring Visualization of Distributed Clusters for SmartX Multiview Visibility and Security, Jun-Sik Shin, Muhammad Usman, Jong-Won Kim

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

Visualizing Remote Network Reactions with Firewall Probe, Hyuga Kobayashi, Hideya Ochiai, Hiroshi Esaki

Heterogeneous Logs Graph Visualization and Clustering for Attack Traces Discovery, Laetitia Leichtnam, Éric Totel, Nicolas Prigent, Mé Ludovic
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