

# VIS Program

## Saturday, October 19

9:00AM-5:40PM

- [Doctoral Colloquium](#) (by invitation only) (location: By invitation only)

## Sunday, October 20

9:00AM-12:20PM

- [Workshop: Urban Data Visualization \(CityVis\)—Focus: The Role of the Citizen](#) (location: Room 1)
- [Tutorial: Topological Data Analysis Made Easy with the Topology ToolKit, A SequeI](#) (location: Room 2)
- [Workshop: SetVA: Set Visual Analytics](#) (location: Room 3)
- [Tutorial: Visualizing Multivariate Networks](#) (location: Room 8)
- [Workshop: Visualization for Communication \(VisComm\)](#) (location: Room 15)

9:00AM-5:40PM

- [VDS](#) (location: Ballroom A)
- [VAHC](#) (location: Ballroom B)
- [VIS4DH](#) (location: Ballroom C)

9:00AM-9:00PM

- [Posters](#) (location: Exhibition Hall A)

10:30-10:50AM

- [Break](#)

12:20-2:20PM

- [Lunch Break](#)

2:20-5:40PM

- [Workshop: Vis X Vision: Workshop on Novel Directions in Vision Science and Visualization Research](#) (location: Room 1)
- [Tutorial: VTK-m - A ToolKit for Scientific Visualization on Many-Core Processors](#) (location: Room 2)
- [Workshop: MLUI 2019: Machine Learning from User Interactions for Visualization and Analytics](#) (location: Room 3)
- [Tutorial: Better Presentations for Visualization Research](#) (location: Room 8)

2:20-3:50PM

- [Application Spotlight: Visualization in meteorology and climate sciences: recent research and open challenge](#) (location: Room 15)

3:50-4:10PM

- [Break](#)

4:10-5:40PM

- [Application Spotlight: Visual Analysis of Air and Maritime Trajectory Data](#) (location: Room 15)

7:00-9:00PM

- [Opening Reception](#) (location: Exhibition Hall A)

## Monday, October 21

9:00AM-12:20PM

- [Workshop: DSIA 2019: Data Systems for Interactive Analysis](#) (location: Room 1)
- [Tutorial: Visual Analysis and Design](#) (location: Room 2)
- [Workshop: Evaluation of Interactive Visual Machine Learning Systems \(EVIVA-ML\)](#) (location: Room 3)
- [Tutorial: Statistical Data Representation, Visualization, and Uncertainty Analysis](#) (location: Room 8)
- [Tutorial: Beyond Paper Types: How to Evaluate and Communicate VIS Research Contributions](#) (location: Room 15)

9:00AM-5:40PM

- [Posters](#) (location: Exhibition Hall A)
- [LDAV](#) (location: Ballroom A)
- [VisInPractice](#) (location: Ballroom B)
- [VAST Challenge](#) (location: Ballroom C)

10:30-10:50AM

- [Break](#)

12:20-2:20PM

- [Lunch Break](#)

2:20-5:40PM

- [Workshop: Challenges in Multilayer Network Visualization and Analysis](#) (location: Room 1)
- [Tutorial: Visualization for Social Good](#) (location: Room 2)
- [Workshop: 2nd Workshop on Visualization for AI Explainability \(VISxAI\)](#) (location: Room 3)
- [Tutorial: User-Centred Evaluation in Visualization](#) (location: Room 8)

2:20-3:50PM

- [Application Spotlight: Visualization Software Development for Researchers and End Users - from general issues to specific challenges for medical](#) (location: Room 15)

3:50-4:10PM

- [Break](#)

4:10-5:40PM

4:10-5:40PM

- Application Spotlight: Visualization paradigms in the renewable energy space (location: Room 15)

6:00-7:30PM

- FF (Tue & Wed Sessions) (location: Ballroom A)

**Tuesday, October 22**

8:30-10:00AM

- VIS Welcome, VGTC Awards, TOT Awards (location: Ballroom ABC)

9:00AM-5:40PM

- [Posters](#) (location: Exhibition Hall A)

10:00-11:00AM

- [VIS Best Papers](#) (location: Ballroom ABC)

11:00-11:20AM

- Break

11:20AM-12:20PM

- VIS Keynote (location: Ballroom ABC)

12:20-2:20PM

- Lunch Break

2:20-2:35PM

- [VAST Opening](#) (location: Ballroom A)
- [InfoVis Opening](#) (location: Ballroom B)
- [SciVis Opening](#) (location: Ballroom C)

2:35-3:50PM

- [A Tour of VAST](#) (location: Ballroom A)
- [Provocations](#) (location: Ballroom B)
- [Scalar Topology](#) (location: Ballroom C)
- [Short Papers: Novel Interfaces](#) (location: Room 1)

2:20-3:50PM

- [Panel: Exploring Reproducibility in Vis: Expanding on the National Academies' Report on Reproducibility and Replicability in Science](#) (location: Room 2+3)
- SciVis Contest (location: Room 8+15)

3:50-4:10PM

- Break

4:10-5:40PM

- [VIS Meets Machine Learning](#) (location: Ballroom A)
- [Features and Topology](#) (location: Ballroom B)

- [Bias & Patterns](#) (location: Ballroom C)
- [Short Papers: Systems and Design Studies](#) (location: Room 1)
- Application Spotlight: Visualization Enabled Scientific Discovery (location: Room 2+3)
- Supporters Presentations (location: Room 8+15)

6:30-9:00PM

- [VIS Arts Program Opening Event](#) (location: South Foyer)

7:00-8:00PM

- Celebration of Life: Luana Micallef (location: Room 8+15)

**Wednesday, October 23**

9:00-10:30AM

- [Multiscale Visualization](#) (location: Ballroom A)
- [Drawing Nodes and Edges](#) (location: Ballroom B)
- [Flow](#) (location: Ballroom C)
- [Short Papers: Perception, Cognition, and Visualization Design](#) (location: Room 1)
- VizSec (location: Room 2+3)
- [VISAP Session 1](#) (location: Room 8+15)

9:00AM-5:40PM

- [Posters](#) (location: Exhibition Hall A)

10:30-10:50AM

- Break

10:50AM-12:20PM

- [Evaluation & Reproducibility](#) (location: Ballroom A)
- [Animation and Sports](#) (location: Ballroom B)
- [Multivariate & Multidimensional Data](#) (location: Ballroom C)
- [CG&A Session 1](#) (location: Room 8+15)
- Application Spotlight: Does AI mean data visualization is dead? (location: Room 1)
- VizSec (location: Room 2+3)

12:20-2:20PM

- Lunch Break

1:00-2:00PM

- [reVise Town Hall: Restructuring IEEE VIS for the Future](#) (location: Ballroom A)

2:20-3:50PM

- [\(De\)Construction](#) (location: Ballroom A)
- [Immersion and Virtual Environments](#) (location: Ballroom B)
- [Planning and Situational Awareness](#) (location: Ballroom C)
- [Short Papers: VIS Meets Machine Learning](#) (location: Room 1)

- [Short Papers: VIS meets Machine Learning](#) (location: Room 1)
- VizSec (location: Room 2+3)
- [Panel: Top Research Questions for Empirical Studies in Visualization](#) (location: Room 8+15)

3:50-4:10PM

- Break

4:10-5:40PM

- FF (Thu & Fri Sessions) (location: Ballroom A)

5:10-7:00PM

- [Posters + Networking + Hiring events](#) (location: Ballroom ABC)

7:00-9:00PM

- VIS Dinner Reception (location: Ballroom ABC)

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**Thursday, October 24**

9:00-10:30AM

- [XAI and Fairness](#) (location: Ballroom A)
- [Vis for Software and Systems](#) (location: Ballroom B)
- [Large Data and Dimensionality Reduction](#) (location: Ballroom C)
- [VISAP Session 2](#) (location: Room 2+3)
- [SIGGRAPH Session](#) (location: Room 8+15)

9:00AM-12:20PM

- [BioVis Challenge](#) (location: Room 1)

9:00AM-5:40PM

- [Posters](#) (location: Exhibition Hall A)

10:30-10:50AM

- Break

10:50AM-12:20PM

- [Scatterplots](#) (location: Ballroom A)
- [Volume Visualization](#) (location: Ballroom B)
- [Geovisualization](#) (location: Ballroom C)
- [CG&A Session 2](#) (location: Room 2+3)

12:20-2:20PM

- Lunch Break

1:00-2:00PM

- VIS 2020 Kick-off Meeting (location: Ballroom A)

2:20-3:50PM

- [Ensembles & Uncertainty](#) (location: Ballroom A)

- [Interactive Machine Learning](#) (location: Ballroom B)

- [Infographics & Storytelling](#) (location: Ballroom C)

- [Short Papers: Biology, Chemistry, and Medicine](#) (location: Room 1)

- [Panel: Visual Analytics, past, present and future](#) (location: Room 2+3)

3:50-4:10PM

- Break

4:10-5:40PM

- [Visualization in Medicine](#) (location: Ballroom A)
- [Words & Documents](#) (location: Ballroom B)
- [What's the Difference?](#) (location: Ballroom C)
- [Short Papers: Multi-Dimensional Data, Time Series, Graphs, and Trees](#) (location: Room 1)
- Application Spotlight: Knowledge-assisted Visual Analytics meets Guidance and Onboarding (location: Room 2+3)

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**Friday, October 25**

9:00-10:30AM

- [Influencers](#) (location: Ballroom A)
- [Color](#) (location: Ballroom B)
- [Searching & Querying](#) (location: Ballroom C)
- [Short Papers: Scalar, Vector, and Tensor Fields](#) (location: Room 1)
- Application Spotlight: Feature-based Visual Interactive Systems to Optimize Decision Making (location: Room 2+3)

10:30-10:50AM

- Break

11:00-12:00PM

- VIS Capstone (location: Ballroom ABC)

12:00-12:30PM

- VIS Closing (location: Ballroom ABC)

Papers Sessions

Please note that sessions are composed of papers mixed from the VAST [V], InfoVis [I], and SciVis [S] conferences, and are marked as such preceding the paper titles. In addition, the final publication venue for each paper is marked in parentheses following the title:

- (I) TVCG journal special issue (SI) papers
- (T) Previously published TVCG journal papers presented at VIS
- (C) Conference papers

TUESDAY, OCTOBER 22

10:00-11:00AM  
Room: Ballroom ABC  
VIS Best Papers  
Session Chair: Leila De Floriani, Marc Streit, Tobias Schreck

- [V] FlowSense: A Natural Language Interface for Visual Data Exploration within a Dataflow System (I) (Best Paper Award)  
Authors: Bowen Yu, Claudio T. Silva
- [I] Data Changes Everything: Challenges and Opportunities in Data Visualization Design Handoff (I) (Best Paper Award)  
Authors: Jagoda Walny, Christian Frisson, Meka West, Doris Kosminsky, Søren Knudsen, Sheelagh Carpendale, Wesley Willett
- [S] InSiNetet: Deep Image Synthesis for Parameter Space Exploration of Ensemble Simulations (I) (Best Paper Award)  
Authors: Wenbin He, Junpeng Wang, Hanqi Guo, Ko-Chih Wang, Han-Wei Shen, Mukund Raj, Youssef S. G. Nashed, Tom Peterka
- Periphery Plots for Contextualizing Heterogeneous Time-Based Charts (C) (Best Paper Award)  
Authors: Bryce Morrow, Trevor Manz, Arlene E. Chung, Nils Gehlenborg, David Gotz

TUESDAY, OCTOBER 22

2:35-3:50PM  
Room: Ballroom A  
A Tour of VAST  
Session Chair: Remco Chang, Ross Maciejewski, Daniel Keim

- [V] NNVA: Neural Network Assisted Visual Analysis of Yeast Cell Polarization Simulation (I) (Best Paper Honorable Mention)  
Authors: Subhashis Hazarika, Haoyu Li, Ko-Chih Wang, Han-Wei Shen, Ching-Shan Chou
- [V] Supporting Analysis of Dimensionality Reduction Results with Contrastive Learning (I) (Best Paper Honorable Mention)  
Authors: Takanori Fujiwara, Oh-Hyun Kwon, Kwan-Liu Ma
- [V] The What-If Tool: Interactive Probing of Machine Learning Models (I)  
Authors: James Wexler, Mahima Pushkarna, Tolga Bolukbası, Martin Wattenberg, Fernanda Viegas, Jimbo Wilson
- [V] Understanding the Role of Alternatives in Data Analysis Practices (I)  
Authors: Jiali Liu, Nadia Boukheifia, James Eagan
- [V] VASABI: Doing User Behaviour Analytics through Interactive Visual Hierarchical User Profiles (I)  
Authors: Phong H. Nguyen, Rafael Henkin, Siming Chen, Natalia Andrienko, Gennady Andrienko, Olivier Thonnard, Cagatay Turkey

TUESDAY, OCTOBER 22

2:35-3:50PM  
Room: Ballroom B  
Provocations  
Session Chair: Petra Isenberg

- [I] Data by proxy – material traces as autographic visualizations (I)  
Authors: Dietmar Offenhuber
- [I] Design by Immersion: A Transdisciplinary Approach to Problem-Driven Visualizations (I)  
Authors: Kyle Wm Hall, Adam James Bradley, Uta Hinrichs, Samuel Huron, Jo Wood, Christopher Collins, Sheelagh Carpendale
- [I] Criteria for Rigor in Visualization Design Study (I)  
Authors: Miriah Meyer, Jason Dykes
- [I] What is Interaction for Data Visualization? (I)  
Authors: Evanthia Dimara, Charles Perin
- [I] Why Authors Don't Visualize Uncertainty (I)  
Authors: Jessica Hullman

TUESDAY, OCTOBER 22

2:35-3:50PM  
Room: Ballroom C  
Scalar Topology  
Session Chair: Bei Wang

- [S] High-throughput feature extraction for measuring attributes of deforming open cell foams (I)  
Authors: Steve Petruzza, Attila Gyulassy, Samuel Leventhal, Jackson Baglino, Michael Czabaj, Ashely Spears, Valerio Pascucci
- [S] Progressive Wasserstein Barycenters of Persistence Diagrams (I) (Best Paper Honorable Mention)  
Authors: Jules Vidal, Joseph Budin, Julien Tierny
- [S] The Effect of Data Transformations on Scalar Field Topological Analysis of High-Order FEM Solutions (I)  
Authors: Ashok Jallepalli, Joshua A. Levine, Robert M. (Mike) Kirby
- [S] Toward Localized Topological Data Structures: Querying the Forest for the Tree (I) (Best Paper Honorable Mention)  
Authors: Pavol Klacansky, Attila Gyulassy, Peer-Timo Bremer, Valerio Pascucci
- [S] Edit Distance between Merge Trees (T)  
Authors: Raghavendra Sridharamurthy, Talha Bin Masood, Adhitya Kamakshidasan, Vijay Natarajan

TUESDAY, OCTOBER 22

2:35-3:50PM  
Room: Room 1  
Short Papers: Novel Interfaces  
Session Chair: Nathalie Riche

- Graph-assisted Visualization of Microvascular Networks (C) (Best Paper Honorable Mention)  
Authors: Pavel Govyadinov, Tasha Womack, Jason Eriksen, David Mayerich, Guoning Chen
- Learning Vis Tools: Teaching Data Visualization Tutorials (C) (Best Paper Honorable Mention)  
Authors: Leo Yu-Ho Lo, Yao Ming, Huamin Qu
- Sociotechnical Considerations for Accessible Visualization Design (C)  
Authors: Alan Lundgard, Crystal Lee, Arvind Satyanarayan
- Toward Interface Defaults for Vague Modifiers in Natural Language Interfaces for Visual Analysis (C)  
Authors: Marti Hearst, Melanie Tory, Vidya Settur
- VisWall: Visual Data Exploration using Direct Combination on Large Touch Displays (C)  
Authors: Mallika Agarwal, Arjun Srinivasan, John Skasko
- EasyPZ.js: Interaction Binding For Pan and Zoom Visualizations (C)  
Authors: Michail Schwab, James Tompkin, Jeff Huang, Michelle A. Borkin
- Would You Like A Chart With That? Incorporating Visualizations into Conversational Interfaces (C)  
Authors: Marti Hearst, Melanie Tory

**TUESDAY, OCTOBER 22**

4:10-5:40PM

Room: Ballroom A

*VIS Meets Machine Learning*

*Session Chair: Eli Brown*

**[V] GUIRO: User-Guided Matrix Reordering (I)**

Authors: Michael Behrisch, Tobias Schreck, Hanspeter Pfister

**[S] LassoNet: Deep Lasso-Selection of 3D Point Clouds (I)**

Authors: Zhutian Chen, Wei Zeng, ZhiGuang Yang, Lingyun Yu, Chi-Wing Fu, Huamin Qu

**[S] TSR-TVD: Temporal Super-Resolution for Time-Varying Data Analysis and Visualization (I)**

Authors: Jun Han, Chaoli Wang

**[I] GenerativeMap: Visualization and Exploration of Dynamic Density Maps via Generative Learning Model (I)**

Authors: Chen Chen, Changbo Wang, Xue Bai, Peiyang Zhang, Chenhui Li

**[V] Facetto: Combining Unsupervised and Supervised Learning for Hierarchical Phenotype Analysis in Multi-Channel Image Data (I)**

Authors: Robert Krüger, Johanna Beyer, Won-Dong Jang, Nam Wook Kim, Artem Sokolov, Peter Sorger, Hanspeter Pfister

**[V] ProtoSteer: Steering Deep Sequence Model with Prototypes (I)**

Authors: Yao Ming, Panpan Xu, Furui Cheng, Huamin Qu, Liu Ren

**TUESDAY, OCTOBER 22**

4:10-5:40PM

Room: Ballroom B

*Features and Topology*

*Session Chair: Ingrid Hotz*

**[S] Dynamic Nested Tracking Graphs (I)**

Authors: Jonas Lukaszczk, Christoph Garth, Tim Biedert, Ross Maciejewski, Gunther H. Weber, Heike Leitte

**[S] Extraction and Visual Analysis of Potential Vorticity Banners around the Alps (I)**

Authors: Robin Bader, Michael Sprenger, Nikolina Ban, Stefan Rüdüsühli, Christoph Schär, Tobias Günther

**[S] Multi-Scale Topological Analysis of Asymmetric Tensor Fields on Surfaces (I)**

Authors: Fariba Khan, Lawrence Roy, Eugene Zhang, Botong Qu, Shih-Hsuan Hung, Harry Yeh, Robert S. Laramée, Yue Zhang

**[S] Vector Field Topology of Time-Dependent Flows in a Steady Reference Frame (I)**

Authors: Irene Baeza Rojo, Tobias Günther

**[S] Feature Tracking by Two-Step Optimization (T)**

Authors: Andrea Schnorr, Dirk N. Helmrich, Dominik Denker, Torsten W. Kuhlén, Bernd Hentschel

**[V] Scalable Topological Data Analysis and Visualization for Interpreting Data-Driven Models in Scientific Applications (I)**

Authors: Shusen Liu, Di Wang, Dan Maljovec, Rushil Anirudh, Jayaraman J. Thiagarajan, Sam Ade Jacobs, Brian C. Van Essen, David Hysom, Jae-Seung Yeom, Jim Gaffney, J. Luc Peterson, Peter B. Robinson, Harsh Bhatia, Valerio Pascucci, Brian K. Spears, Peer-Timo Bremer

**TUESDAY, OCTOBER 22**

4:10-5:40PM

Room: Ballroom C

*Bias & Patterns*

*Session Chair: Karen Schloss*

**[I] Biased Average Position Estimates in Line and Bar Graphs: Underestimation, Overestimation, and Perceptual Pull (I)**

Authors: Cindy Xiong, Cristina R Ceja, Casimir Ludwig, Steven Franconeri

**[I] Measures of the benefit of direct encoding of data deltas for data pair relation perception (I)**

Authors: Christine Nothelfer, Steven Franconeri

**[I] A Task-based Taxonomy of Cognitive Biases for Information Visualization (T)**

Authors: Evanthia Dimara, Steven Franconeri, Catherine Plaisant, Anastasia Bezerianos, Pierre Dragicevic

**[I] The Curse of Knowledge in Visual Data Communication (T)**

Authors: Cindy Xiong, Lisanne van Weelden, Steven Franconeri

**[V] Evaluating Perceptual Bias During Geometric Scaling of Scatterplots (I)**

Authors: Yating Wei, Honghui Mei, Ying Zhao, Shuyue Zhou, Bingru Lin, Haojin Jiang, Wei Chen

**[V] FDIve: Learning Relevance Models using Pattern-based Similarity Measures (C)**

Authors: Frederik L. Dennig, Thomas E. Polk, Zudi Lin, Tobias Schreck, Hanspeter Pfister, Michael Behrisch

**TUESDAY, OCTOBER 22**

4:10-5:40PM

Room: Room 1

*Short Papers: Systems and Design Studies*

*Session Chair: Michael Sedlmair*

**Designing Visual Guides for Casual Listeners of Live Orchestral Music (C)**

Authors: Catherine Solis, Fahimeh Rajabiyaadi, Fanny Chevalier

**Uncovering Data Landscapes through Data Reconnaissance and Task Wrangling (C)**

Authors: Anamaria Crisan, Tamara Munzner

**Sabrina: Modeling and Visualization of Economy Data with Incremental Domain Knowledge (C)**

Authors: Alessio Arleo, Christos Tsigkanos, Chao Jia, Roger A. Leite, Ilir Murturi, Manfred Klaffenboeck, Shahram Dustdar, Michael Wimmer, Silvia Miksch, Johannes Sorger

**Visual Analysis of the Time Management of Learning Multiple Courses in Online Learning Environment (C)**

Authors: Huan He, Bo Dong, Qinghua Zheng, Dehai Di, Yating Lin

**H-Matrix: Hierarchical Matrix for Visual Analysis of Cross-Linguistic Features in Large Learner Corpora (C)**

Authors: Mariana Shimabukuro, Jessica Zipf, Mennatallah El-Assady, Christopher Collins

**OCTVis: Ontology-based Comparison of Topic Models (C)**

Authors: Amon Ge, Hyeju Jang, Giuseppe Carenini, Kendall Ho, Young Ji Lee

**MissBLN: Visual Analysis of Missing Links in Bipartite Networks (C)**

Authors: Jian Zhao, Maoyuan Sun, Francine Chen, Patrick Chiu

**Facti: Factorizing Tensors into Interpretable and Scrutinizable Patterns (C)**

Authors: Xidao Wen, Yu-Ru Lin, Yongsu Ahn, Konstantinos Pelechrinis, Xi Liu, Nan Cao

**WEDNESDAY, OCTOBER 23**

9:00-10:30AM

Room: Ballroom A

*Multiscale Visualization*

*Session Chair: Vijay Natarajan*

**[I] Pattern-Driven Navigation in 2D Multiscale Visualizations with Scalable Insets (I)**

Authors: Fritz Lekschas, Michael Behrisch, Benjamin Bach, Peter Kerpedjiev, Nils Gehlenborg, Hanspeter Pfister

**[S] Multi-Scale Procedural Animations of Microtubule Dynamics Based on Measured Data (I)**

Authors: Tobias Klein, Ivan Viola, Eduard Gröller, Peter Mindele

**[S] OpenSpace: A System for Astrogaphics (I)**

Authors: Alexander Bock, Emil Axelsson, Jonathas Costa, Gene Payne, Micah Acinapura, Vivian Trakinski, Carter B Emmart PhD, Claudio T. Silva, Charles Hansen, Anders Ynnerman

**[S] Scale-Space Splatting: Reforming Spacetime for the Cross-Scale Exploration of Integral Measures in Molecular Dynamics (I)**

Authors: Juraj Pálenik, Jan Byška, Stefan Bruckner, Helwig Hauser

**[S] ScaleTrotter: Illustrative Visual Travels Across Negative Scales (I)**

Authors: Sarkis Halladjian, Haichao Miao, David Kouřil, Eduard Gröller, Ivan Viola, Tobias Isenberger

**WEDNESDAY, OCTOBER 23**

9:00-10:30AM

Room: Ballroom B

*Drawing Nodes and Edges*

*Session Chair: Jessie Kennedy*

**[I] A Deep Generative Model for Graph Layout (I)**

Authors: Oh-Hyun Kwon, Kwan-Liu Ma

**[I] DeepDrawing: A Deep Learning Approach to Graph Drawing (I)**

Authors: Yong Wang, Zhihua Jin, Qianwen Wang, Weiwei Cui, Tengfei Ma, Huamin Qu

**[I] Interactive Structure-aware Blending of Diverse Edge Bundling Visualizations (I)**

Authors: Yunhai Wang, Mingliang Xue, Yanyan Wang, Xinyuan Yan, Baoquan Chen, Chi-Wing Fu, Christophe Hurter

**[I] Persistent Homology Guided Force-Directed Graph Layouts (I)**

Authors: Ashley Suh, Mustafa Hajji, Bei Wang, Carlos Scheidegger, Paul Rosen

**[I] Graph Drawing by Stochastic Gradient Descent (T)**

Authors: J X Zheng, D F M Goodman, S Pawar

**[V] The Effect of Edge Bundling and Seriation on Sensemaking of Biclusters in Bipartite Graphs (T)**

Authors: Maoyuan Sun, Jian Zhao, Hao Wu, Kurt Luther, Chris North, Naren Ramakrishnan

WEDNESDAY, OCTOBER 23

9:00-10:30AM

Room: Ballroom C

Flow

Session Chair: Robert S Laramée

[S] Accelerated Monte Carlo Rendering of Finite-Time Lyapunov Exponents (J)

Authors: Irene Baeza Rojo, Markus Gross, Tobias Günther

[S] Detection and Visualization of Splat and Antisplat Events in Turbulent Flows (T)

Authors: Baldwin Nsonga, Martin Niemann, Jochen Fröhlich, Joachim Staib, Stefan Gumhold, Gerik Scheuermann

[S] Analysis of the Near-Wall Flow in a Turbine Cascade by Splat Visualization (J)

Authors: Baldwin Nsonga, Gerik Scheuermann, Stefan Gumhold, Jordi Ventosa-Molina, Denis Koschichow, Jochen Fröhlich

[S] Extreme-Scale Stochastic Particle Tracing for Uncertain Unsteady Flow Visualization and Analysis (T)

Authors: Hanqi Guo, Wenbin He, Sangmin Seo, Han-Wei Shen, Emil Mihai Constantinescu, Chunhui Liu, Tom Peterka

[S] FlowNet: A Deep Learning Framework for Clustering and Selection of Streamlines and Stream Surfaces (T)

Authors: Jun Han, Jun Tao, Chaoli Wang

[S] Hyper-Objective Vortices (T)

Authors: Tobias Günther, Holger Theisel

WEDNESDAY, OCTOBER 23

9:00-10:30AM

Room: Room 1

Short Papers: Perception, Cognition, and Visualization Design

Session Chair: Colin Ware

A Markov Model of Users' Interactive Behavior in Scatterplots (C)

Authors: Emily Wall, Arup Arcalgud, Kuhu Gupta, Andrew Jo

Slope-Dependent Rendering of Parallel Coordinates to Reduce Density Distortion and Ghost Clusters (C)

Authors: David Pomeranke, Frederik L. Dennig, Daniel Keim, Johannes Fuchs, Michael Blumenschein

Evaluating Ordering Strategies of Star Glyph Axes (C)

Authors: Matthias Miller, Xuan Zhang, Johannes Fuchs, Michael Blumenschein

Interactive Visualisation of Hierarchical Quantitative Data: an Evaluation (C)

Authors: Linda Woodburn, Yalong Yang, Kim Marriott

Evidence for Area as the Primary Visual Cue in Pie Charts (C)

Authors: Robert Kosara

Visual cues in estimation of part-to-whole comparison (C)

Authors: Stephen Redmond

Towards a Design Space for Mitigating Cognitive Bias in Visual Analytics (C)

Authors: Emily Wall, John Stasko, Alex Endert

Thumbnails for Data Stories: Survey of Current Practice (C)

Authors: Hwiyeon Kim, Juyoung Oh, Yunha Han, Sungahn Ko, Matthew Brehmer, Bum Chul Kwon

Towards Quantifying multiple view layouts in visualisation as seen from research publications (C)

Authors: Hayder Mahdi Al-manee, Jonathan C Roberts

WEDNESDAY, OCTOBER 23

10:50AM-12:20PM

Room: Ballroom A

Evaluation & Reproducibility

Session Chair: Lane Harrison

[J] Toward Objective Evaluation of Working Memory in Visualizations: A Case Study Using Pupillometry and a Dual-Task Paradigm (J)

Authors: Lace M. K. Padilla, Spencer Castro, P. Samuel Quinan, Ian T. Ruginski, Sarah Creem-Regehr

[J] VisTA: Integrating Machine Intelligence with Visualization to Support the Investigation of Think-Aloud Sessions (J)

Authors: Mingming Fan, Ke Wu, Jian Zhao, Yue Li, Winter Wei, Khai Truong

[S] Embedding Meta-Information into Visualizations (T)

Authors: Alok Hota, Jian Huang

[S] On Evaluating Runtime Performance of Interactive Visualizations (T)

Authors: Valentin Bruder, Christoph Müller, Steffen Frey, Thomas Ertl

[V] The Validity and Generalizability of Summative Evaluation Methods in Visual Analytics (J)

Authors: Mosab Khayat, Morteza Karimzadeh, David Ebert, Arif Ghafoor

[V] An Analysis of Automated Visual Analysis Classification: Interactive Visualization Task Inference of Cancer Genomics Domain Experts (T)

Authors: Connor C. Gramazio, Jeff Huang, David H. Laidlaw

WEDNESDAY, OCTOBER 23

10:50AM-12:20PM

Room: Ballroom B

Animation and Sports

Session Chair: Charles Perin

[J] A Comparative Evaluation of Animation and Small Multiples for Trend Visualization on Mobile Phones (J)

Authors: Matthew Brehmer, Bongshin Lee, Petra Isenberg, Eun Kyoung Choe

[J] A Comparison of Visualizations for Identifying Correlation Over Time and Space (J)

Authors: Vanessa Peña-Araya, Emmanuel Pietriga, Anastasia Bezerianos

[J] Common Fate for Animated Transitions in Visualization (J)

Authors: Amira Chalbi, Jacob Ritchie, Deogun Park, Jungu Choi, Nicolas Roussel, Niklas Elmqvist, Fanny Chevalier

[V] CourtTime: Generating Actionable Insights into Tennis Matches Using Visual Analytics (J)

Authors: Thomas E. Polk, Dominik Jäckle, Johannes Häußler, Jing Yang

[V] Tac-Simur: Visual Analytics for Tactic-based Match Simulation of Table Tennis (J)

Authors: Jiachen Wang, Kejian Zhao, Dazhen Deng, Anqi Cao, Xiao Xie, Zheng Zhou, Hui Zhang, Yingcai Wu

[V] COPE: Interactive Exploration of Co-occurrence Patterns in Spatial Time Series (T)

Authors: Jie Li, Siming Chen, Kang Zhang, Gennady Andrienko, Natalia Andrienko

WEDNESDAY, OCTOBER 23

10:50AM-12:20PM

Room: Ballroom C

Multivariate & Multidimensional Data

Session Chair: Lars Linsen

[V] Taxonomizer: A Visual Analytics Framework for Constructing Fully Labeled Hierarchies from Multivariate Data (T)

Authors: Salman Mahmood, Klaus Mueller

[J] An Incremental Dimensionality Reduction Method for Visualizing Streaming Multidimensional Data (J)

Authors: Takanori Fujiwara, Jia-Kai Chou, Shilpika Shilpika, Panpan Xu, Liu Ren, Kwan-Liu Ma

[S] Generalizing Iso-surfaces to Multi-variate Data (T)

Authors: Jochen Jankowai, Ingrid Hotz

[S] TTHRESH: Tensor Compression for Multidimensional Visual Data (T)

Authors: Rafael Ballester-Ripoll, Peter Lindstrom, Renato Pajarola

[V] Selection Bias Tracking and Detailed Subset Comparison for High-Dimensional Data (J)

Authors: David Borland, Wen yuan Wang, Jonathan Zhang, Joshua Shrestha, David Gotz

[V] Visual Analysis of High-Dimensional Event Sequence Data via Dynamic Hierarchical Aggregation (J)

Authors: David Gotz, Jonathan Zhang, Wen yuan Wang, Joshua Shrestha, David Borland

WEDNESDAY, OCTOBER 23

10:50AM-12:20PM

Room: Room 8+15

CG&A Session 1

Session Chair: Tim Dwyer

A Walk Among the Data: Exploration and Anthropomorphism in Immersive Unit Visualizations

Authors: Alexander Ivanov, Kurtis Danyluk, Christian Jacob, Wesley Willett

Immersive Analytics Lessons from the Electronic Visualization Laboratory: a 25 Year Perspective

Authors: G. Elisabeta Marai, Jason Leigh, Andrew Johnson

Comfortable Immersive Analytics with the VirtualDesk Metaphor

Authors: Jorge A. Wagner Filho, Carla M. D. S. Freitas, Luciana Nedel

Augmented Reality Graph Visualizations - Investigation of Visual Styles in 3D Node-Link Diagrams

Authors: Wolfgang Büschel, Stefan Vogt, Raimund Dachsel

Visualization and the Digital Humanities: Moving Toward Stronger Collaborations

Authors: Adam James Bradley, Mennatallah El-Assady, Katharine Coles, Eric Alexander, Min Chen, Christopher Collins, Stefan Jänicke, David Joseph Wrisley

Graphoto: Aesthetically Pleasing Charts for Casual Information Visualization

Authors: Hi Jwan Park, Arie Kaufman, Klaus Mueller

WEDNESDAY, OCTOBER 23

2:20-3:50PM

Room: Ballroom A

(De)Construction

Session Chair: Jason Dykes

[I] Construct-A-Vis: Free-Form Visualization Creation for Children (I)

Authors: Fearn Bishop, Johannes Zagermann, Ulrike Pfeil, Gemma Sanderson, Harald Reiterer, Uta Hinrichs

[I] Critical Reflections of Visualization Authoring Systems (I)

Authors: Arvind Satyanarayan, Bongshin Lee, Donghao Ren, Jeffrey Heer, John Stasko, John R Thompson, Matthew Brehmer, Zhicheng Liu

[I] Decoding Complex Visualizations in Science Museums – An Empirical Study (I)

Authors: Joyce Ma, Kwan-Liu Ma, Jennifer Frazier

[I] Investigating Direct Manipulation of Graphical Encodings as a Method for User Interaction (I)

Authors: Bahador Saket, Samuel Huron, Charles Perin, Alex Endert

[S] Artifact-Based Rendering: Harnessing Natural and Traditional Visual Media for More Expressive and Engaging 3D Visualizations (I)

Authors: Seth A Johnson, Francesca Samsel, Greg Abram, Daniel Olson, Andrew Solis, Bridger Herman, Philip Wolfram, Christophe Langlet, Daniel F. Keefe

[V] Origraph: Interactive Network Wrangling (C)

Authors: Alex Bigelow, Carolina Nobre, Miriah Meyer, Alexander Lex

WEDNESDAY, OCTOBER 23

2:20-3:50PM

Room: Ballroom B

Immersion and Virtual Environments

Session Chair: Sarah Goodwin

[I] MARVisT: Authoring Glyph-based Visualization in Mobile Augmented Reality (T)

Authors: Zhutian Chen, Yijia Su, Yifang Wang, Qianwen Wang, Huamin Qu, Yingcai Wu

[I] Designing for Mobile and Immersive Visual Analytics in the Field (I)

Authors: Matt Whitlock, Keke Wu, Danielle Albers Szafr

[I] Evaluating an Immersive Space-Time Cube Geovisualization for Intuitive Trajectory Data Exploration (I)

Authors: Jorge A. Wagner, Wolfgang Stuerzlinger, Luciana Nedel

[I] The Impact of Immersion on Cluster Identification Tasks (I)

Authors: Matthias Kraus, Niklas Kai Weiler, Daniela Oelke, Johannes Kehrer, Daniel Keim, Johannes Fuchs

[I] There Is No Spoon: Evaluating Performance, Space Use, and Presence with Expert Domain Users in Immersive Analytics (I)

Authors: Andrea Batch, Andrew Cunningham, Maxime Cordeil, Niklas Elmqvist, Tim Dwyer, Bruce H Thomas, Kim Marriott

[S] Deadeye Visualization Revisited: Investigation of Preattentiveness and Applicability in Virtual Environments (I)

Authors: Andrey Krekhov, Sebastian Cmentowski, Andre Waschik, Jens Krueger

WEDNESDAY, OCTOBER 23

2:20-3:50PM

Room: Ballroom C

Planning and Situational Awareness

Session Chair: Kristin Cook

[V] Interactive Learning for Identifying Relevant Tweets to Support Real-time Situational Awareness (I)

Authors: Luke Snyder, Yi-Shan Lin, Morteza Karimzadeh, Dan Goldwasser, David Ebert

[I] A Systematic Review of Visualization in Building Information Modeling (T)

Authors: Paulo Ivson, André Moreira, Francisco Queiroz, Wallas Santos, Waldemar Celes

[V] LightGulder: Guiding Interactive Lighting Design using Suggestions, Provenance, and Quality Visualization (I)

Authors: Andreas Walch, Michael Schwärzler, Christian Luksch, Elmar Eisemann, Theresia Gschwandtner

[V] PlaningVis: A Visual Analytics Approach to Production Planning in Smart Factories (I)

Authors: Dong Sun, Renfei Huang, Yong Wang, Yuanzhe Chen, Jia Zeng, Mingxuan Yuan, Ting-Chuen Pong, Huamin Qu

[V] Visual Analytics for Electromagnetic Situation Awareness in Radio Monitoring and Management (I)

Authors: Ying Zhao, Xiaobo Luo, Xiaru Lin, Hairong Wang, Xiaoyan Kui, Fangfang Zhou, Jinsong Wang, Yi Chen, Wei Chen

[V] sPortfolio: Stratified Visual Analysis of Stock Portfolios (I)

Authors: Xuanwu Yue, Jiaxin Bai, Qinhan Liu, Yiyang Tang, Abishek Puri, Ke Li, Huamin Qu

WEDNESDAY, OCTOBER 23

2:20-3:50PM

Room: Room 1

Short Papers: VIS Meets Machine Learning

Session Chair: Martin Wattenberg

Visualization Assessment: A Machine Learning Approach (C)

Authors: Xin Fu, Yun Wang, Haoyu Dong, Weiwei Cui, Haidong Zhang

A Deep Learning Approach to Selecting Representative Time Steps for Time-Varying Multivariate Data (C)

Authors: William P. Porter, Yunhao Xing, Blaise R von Ohlen, Jun Han, Chaoli Wang

Disentangled Representation of Data Distributions in Scatterplots (C)

Authors: Jaemin Jo, Jinwook Seo

Toward Perception-based Evaluation of Clustering Techniques for Visual Analytics (C)

Authors: Michaël Aupetit, Michael Sedlmair, Mostafa M. Abbas, Abdelkader Baggag, Halima Bensmail

SANVis: Visual Analytics for Understanding Self Attention Networks (C)

Authors: Cheonbok Park, Inyoun Na, Yongjiang Jo, Sungbok Shin, Yoo Jaehyo, Bum Chul Kwon, Jian Zhao, Hyungjong Noh, Yoonseo Lee, Jaegul Choo

TeleGam: Combining Visualization and Verbalization for Interpretable Machine Learning (C)

Authors: Fred Hohman, Arjun Srinivasan, Steven Drucker

Visualizing RNN States with Predictive Semantic Encodings (C)

Authors: Lindsey Sawatzky, Steven Bergner, Fred Popovich

FeatureExplorer: Interactive Feature Selection and Exploration of Regression Models for Hyperspectral Images (C)

Authors: Jieqiong Zhao, Morteza Karimzadeh, Ali Masjedi, Taojun Wang, Xiwen Zhang, Melba Crawford, David Ebert

THURSDAY, OCTOBER 24

9:00-10:30AM

Room: Ballroom A

XAI and Fairness

Session Chair: Chris Bryan

[V] explAiner: A Visual Analytics Framework for Interactive and Explainable Machine Learning (I)

Authors: Thilo Spinner, Udo Schlegel, Hanna Schaefer, Mennatallah El-Assady

[V] Explaining Vulnerabilities to Adversarial Machine Learning through Visual Analytics (I)

Authors: Yuxin Ma, Tiankai Xie, Jundong Li, Ross Maciejewski

[V] FairSight: Visual Analytics for Fairness in Decision Making (I)

Authors: Yongsu Ahn, Yu-Ru Lin

[V] Summit: Scaling Deep Learning Interpretability by Visualizing Activation and Attribution Summarizations (I)

Authors: Fred Hohman, Haekyu Park, Caleb Robinson, Duen Horng Chau

[V] FairVis: Visual Analytics for Discovering Intersectional Bias in Machine Learning (C)

Authors: Ángel Alexander Cabrera, Will Epperson, Fred Hohman, Minsuk Kahng, Jamie Morgenstern, Duen Horng Chau

[V] Visual Genealogy of Deep Neural Networks (T)

Authors: Qianwen Wang, Jun Yuan, Shuxin Chen, Hang Su, Huamin Qu, Shixia Liu

THURSDAY, OCTOBER 24

9:00-10:30AM

Room: Ballroom B

Vis for Software and Systems

Session Chair: Dominik Moritz

[V] CloudDet: Interactive Visual Analysis of Anomalous Performances in Cloud Computing SystemsD (I)

Authors: Ke Xu, Yun Wang, Leni Yang, Yifang Wang, Bo Qiao, Si Qin, Yong Xu, Haidong Zhang, Huamin Qu

[I] Visualizing a Moving Target: A Design Study on Task Parallel Programs in the Presence of Evolving Data and Concerns (I)

Authors: Kathryn P Williams, Alex Bigelow, Katherine Isaacs

[I] How People Visually Represent Discrete Constraint Problem (T)

Authors: Xu Zhu, Miguel A. Nacenta, Özgür Akgun, Peter Nightingale

[I] Preserving Command Line Workflow for a Package Management using ASCII DAG Visualization (T)

Authors: Katherine E. Isaacs, Todd Gamblin

[S] Inviwo - A Visualization System with Usage Abstraction Levels (T)

Authors: Daniel Jönsson, Peter Steneteg, Erik Sundén, Rickard Englund, Sathish Kottravel, Martin Falk, Ingrid Hotz, Anders Ynnerman, Timo Ropinski

[V] Explorative Code Quality Documents (I)

Authors: Haris Mumtaz, Shahid Latif, Fabian Beck, Daniel Weiskopf

THURSDAY, OCTOBER 24

9:00-10:30AM

Room: Ballroom C

Large Data and Dimensionality Reduction

Session Chair: Michael Sedlmair

[I] **OntoPlot: A Novel Visualisation for Non-hierarchical Associations in Large Ontologies (I)**

Authors: Ying Yang, Michael Wybrow, Yuan-Fang Li, Tobias Czauderna, Yongqun He

[I] **P5: Portable Progressive Parallel Processing Pipeline for Interactive Data Analysis and Visualization (I)**

Authors: Kelvin Li, Kwan-Liu Ma

[I] **RSATree: Distribution-Aware Data Representation of Large-Scale Tabular Datasets for Flexible Visual Query (I)**

Authors: Honghui Mei, Yating Wei, Shuyue Zhou, Bingru Lin, Yuanzhe Hu, Ying Zhao, JiaZhi Xia, Wei Chen

[I] **SolarView: Low Distortion Radial Embedding with a Focus (T)**

Authors: Thom Castermans, Kevin Verbeek, Bettina Speckmann, Michel A. Westenberg, Rob Koopman, Shenghui Wang, Hein van den Berg, Arianna Betti

[S] **Scientific Visualization as a Microservice (T)**

Authors: Mohammad Raji, Alok Hota, Tanner Hobson, Jian Huang

[V] **GPGPU Linear Complexity tSNE Optimization (I)**

Authors: Nicola Pezzotti, Julian Thijssen, Alexander Mordvintsev, Thomas Höllt, Baldur van Lew, Boudewijn P.F. Lelieveldt, Elmar Eiseemann, Anna Vilanova

THURSDAY, OCTOBER 24

10:50AM-12:20PM

Room: Ballroom A

Scatterplots

Session Chair: Anastasia Bezerianos

[V] **ScatterNet: A Deep Subjective Similarity Model for Visual Analysis of Scatterplots (T)**

Authors: Yuxin Ma, Anthony K. H. Tung, Wei Wang, Xiang Gao, Zhigeng Pan, Wei Chen

[I] **A Recursive Subdivision Technique for Sampling Multi-class Scatterplots (I)**

Authors: Xin Chen, Tong Ge, Jian Zhang, Baoquan Chen, Chi-Wing Fu, Oliver Deussen, Yunhai Wang

[I] **Data Sampling in Multi-view and Multi-class Scatterplots via Set Cover Optimization (I)**

Authors: Ruizhen Hu, Tingkai Sha, Oliver van Kaick, Oliver Deussen, Hui Huang

[I] **Discriminability Tests for Visualization Effectiveness and Scalability (I)**

Authors: Rafael Veras, Christopher Collins

[I] **Improving the Robustness of Scagnostics (I)**

Authors: Yunhai Wang, Zeyu Wang, Tingting Liu, Michael Correll, Zhanglin Cheng, Oliver Deussen, Michael Sedlmair

[I] **Winglets: Visualizing Association with Uncertainty in Multi-class Scatterplots (I)**

Authors: Min Lu, Shuaiqi Wang, Joel Lanir, Noa Fish, Yang Yue, Daniel CohenOr, Hui Huang

THURSDAY, OCTOBER 24

10:50AM-12:20PM

Room: Ballroom B

Volume Visualization

Session Chair: Markus Hadwiger

[S] **Void-and-Cluster Sampling of Large Scattered Data and Trajectories (I)**

Authors: Tobias Rapp, Christoph Peters, Carsten Dachsbacher

[S] **FeatureLego: Volume Exploration Using Exhaustive Clustering of Super-Voxels (T)**

Authors: Shreeraj Jadhav, Saad Nadeem, Arie Kaufman

[S] **Interactive Visualization and On-Demand Processing of Large Volume Data: A Fully GPU-Based Out-Of-Core Approach (T)**

Authors: Jonathan Sarton, Nicolas Courilleau, Yannick Remion, Laurent Lucas

[S] **Fourier Opacity Optimization for Scalable Exploration (T)**

Authors: Irene Baeza Rojo, Markus Gross, Tobias Günther

[S] **Ray-based Exploration of Large Time-varying Volume Data Using Proxy Per-ray Distributions (T)**

Authors: Ko-Chih Wang, Tzu-Hsuan Wei, Shareef Naeem, Han-Wei Shen

THURSDAY, OCTOBER 24

10:50AM-12:20PM

Room: Ballroom C

Geovisualization

Session Chair: Leilani Battle

[V] **A Visual Analytics System for Exploring, Monitoring, and Forecasting Road Traffic Congestion (T)**

Authors: Chunggi Lee, Yeonjun Kim, Seungmin Jin, Dongmin Kim, Ross Maciejewski, David Ebert, Sungahn Ko

[I] **SmartCube: An Adaptive Data Management Architecture for the Real-Time Visualization of Spatiotemporal Datasets (I)**

Authors: Can Liu, Cong Wu, Hanning Shao, Xiaoru Yuan

[S] **Real-Time Exploration of Large Spatiotemporal Datasets based on Order Statistics (T)**

Authors: Cicero L. Pahins, Nivan Ferreira, João L. Comba

[V] **AirVis: Visual Analytics of Air Pollution Propagation (I)**

Authors: Zikun Deng, Di Weng, Jiahui Chen, Ren Liu, Zhibin Wang, Jie Bao, Yu Zheng, Yingcai Wu

[V] **OD Morphing: balancing simplicity with faithfulness for OD bundling (I)**

Authors: Yan Lyu, Xu Liu, Hanyi Chen, Arpan Mangal, Brian Lim, Kai Liu, Chao Chen

[V] **Semantics-Space-Time Cube: A Conceptual Framework for Systematic Analysis of Texts in Space and Time (T)**

Authors: Jie Li, Siming Chen, Wei Chen, Gennady Andrienko, Natalia Andrienko

THURSDAY, OCTOBER 24

10:50AM-12:20PM

Room: Room 2+3

CG&A Session 2

Session Chair: Nathalie Riche

**VitalVizor: A Visual Analytics System for Studying Urban Vitality**

Authors: Wei Zeng, Yu Ye

**Designing Effective Visual Interactive Systems despite Sparse Availability of Domain Information**

Authors: Benjamin Karer, Alina Freund, Michael Horst, Inga Scheler, Thomas Kossurok, Franz-Josef Brandt

**Mapping and Visualizing Deep-Learning Urban Beautification**

Authors: Tobias Kauer, Sagar Joglekar, Miriam Redi, Luca Maria Aiello, Daniele Quercia

**RNNbow: Visualizing Learning Via Backpropagation Gradients in RNNs**

Authors: Dylan Cashman, Genevieve Patterson, Abigail Mosca, Nathan Watts, Shannon Robinson, Remco Chang

**PUMA-V: Optimizing Parallel Code Performance Through Interactive Visualization**

Authors: Eric Papenhausen, M. Harper Langston, Benoit Meister, Richard A. Lethin, Klaus Mueller

**Cross-Platform Ubiquitous Volume Rendering Using Programmable Shaders in VTK for Scientific and Medical Visualization**

Authors: Aashish Chaudhary, Sankesh J. Jhaveri, Alvaro Sanchez, Lisa S. Avila, Kenneth M. Martin, Allison Vacanti, Marcus D. Hanwell, Will Schroeder

THURSDAY, OCTOBER 24

2:20-3:50PM

Room: Ballroom A

Ensembles & Uncertainty

Session Chair: Julien Tierny

[I] **Uncertainty-Aware Principal Component Analysis (I)**

Authors: Jochen Görtler, Thilo Spinner, Dirk Streeb, Daniel Weiskopf, Oliver Deussen

[S] **A Structural Average of Labeled Merge Trees for Uncertainty Visualization (I)**

Authors: Lin Yan, Yusu Wang, Elizabeth Munch, Ellen Gasparovic, Bei Wang

[S] **Multiscale Visual Drilldown for the Analysis of Large Ensembles of Multi-Body Protein Complexes (I)**

Authors: Katarina Furmanova, Adam Jurčík, Barbora Kozířková, Helwig Hauser, Jan Byřka

[S] **eFESTA: Ensemble Feature Exploration with Surface Density Estimates (T)**

Authors: Wenbin He, Hanqi Guo, Han-Wei Shen, Tom Peterka

[S] **Visualization and Visual Analysis of Ensemble Data: A Survey (T)**

Authors: Junpeng Wang, Subhashis Hazarika, Cheng Li, Han-Wei Shen

[V] **Exploring the Sensitivity of Choropleths under Attribute Uncertainty (T)**

Authors: Zhaosong Huang, Yafeng Lu, Elizabeth A. Mack, Wei Chen, Ross Maciejewski



THURSDAY, OCTOBER 24

2:20-3:50PM

Room: Ballroom B

Interactive Machine Learning

Session Chair: Matthew Berger

[I] Illusion of Causality in Visualized Data (I)

Authors: Cindy Xiong, Joel Shapiro, Jessica Hullman, Steven Franconeri

[V] Ablate, Variate, and Contemplate: Visual Analytics for Discovering Neural Architectures (I)

Authors: Dylan Cashman, Adam Perer, Remco Chang, Hendrik Strobel

[V] VASSL: A Visual Analytics Toolkit for Social Spambot Labeling (I)

Authors: Mosab Khayat, Morteza Karimzadeh, Jieqiong Zhao, David Ebert

[V] Visual Interaction with Deep Learning Models through Collaborative Semantic Inference (I)

Authors: Sebastian Gehrmann, Hendrik Strobel, Robert Krüger, Kathryn Hite, Hanspeter Pfister, Alexander M. Rush

[V] ICE: An Interactive Configuration Explorer for High Dimensional Parameter Spaces (C)

Authors: Anjul Tyagi, Klaus Mueller, Zhen Cao, Tyler Estro, Erez Zadok

[V] Interactive Correction of Mislabeled Training Data (C)

Authors: Xi Ye, Shouxing Xiang, Jiazhi Xia, Jing Wu, Yang Chen, Shixia Lu

THURSDAY, OCTOBER 24

2:20-3:50PM

Room: Ballroom C

Infographics & Storytelling

Session Chair: Robert Kosara

[I] DataShot: Automatic Generation of Fact Sheet from Tabular Data (I)

Authors: Yun Wang, Zhida Sun, Haidong Zhang, Weiwei Cui, Ke Xu, Xiaojuan Ma, Dongmei Zhang

[I] Text-to-Viz: Automatic Generation of Infographics from Natural Language Statements (I)

Authors: Weiwei Cui, Xiaoyu Zhang, Yun Wang, He Huang, Bei Chen, Lei Fang, Haidong Zhang, Jian-Guang Lou, Dongmei Zhang

[I] Towards Automated Infographic Design: Deep Learning-based Auto-Generation of Extensible Timeline (I)

Authors: Zhutian Chen, Yun Wang, Qianwen Wang, Yong Wang, Huamin Qu

[V] EmoCo: Visual Analysis of Emotion Coherence in Presentation Videos (I)

Authors: Haipeng Zeng, Xingbo Wang, Aoyu Wu, Yong Wang, Quan Li, Alex Endert, Huamin Qu

[V] Multimodal Analysis of Video Collections: Visual Exploration of Presentation Techniques in TED Talks (T)

Authors: Aoyu Wu, Huamin Qu

[V] Supporting Story Synthesis: Bridging the Gap between Visual Analytics and Storytelling (T)

Authors: Siming Chen, Jie Li, Gennady Andrienko, Natalia Andrienko, Yun Wang, Phong H. Nguyen, Cagatay Turkey

THURSDAY, OCTOBER 24

2:20-3:50PM

Room: Room 1

Short Papers: Biology, Chemistry, and Medicine

Session Chair: Ivan Viola

scenery: Flexible Virtual Reality Visualization on the Java VM (C)

Authors: Ulrik Günther, Tobias Pietzsch, Aryaman Gupta, Kyle I.S. Harrington, Pavel Tomancak, Stefan Gumhold, Ivo F. Szbalzarini

Interactive Dendritic Spine Analysis Based on 3D Morphological Features (C)

Authors: JunYoung Choi, Sang-Eun Lee, Eunji Cho, Yutaro Kashiwagi, Shigeo Okabe, Sunghoe Chang, Won-Ki Jeong

High Fidelity Visualization of Large Scale Digitally Reconstructed Brain Circuitry with Signed Distance Functions (C)

Authors: Jonas Karlsson, Marwan Abdellah, Sebastian Speierer, Alessandro Enrico Foni, Samuel Lapere, Felix Schurmann

Visual Inspection of DBS Efficacy (C)

Authors: Brad Eric Hollister, Chris Butson, Gordon Duffley, Chris R. Johnson, Paul Rosen

TempoCave: Visualizing Dynamic Connectome Datasets to Support Cognitive Behavioral Therapy (C)

Authors: Ran Xu, Manu Matthew Thomas, Alex Leow, Olusola A. Ajilore, Angus G. Forbes

RuleVis: Constructing Patterns and Rules for Rule-based Models (C)

Authors: David Abramov, Jasmine Tan Otto, Mahika Dubey, Cassia Artanegara, Pierre Boutillier, Walter Fontana, Angus G. Forbes

ElectroLens: Understanding atomistic simulations through spatially-resolved visualization of high-dimensional features (C)

Authors: Xiangyun Lei, Fred Hohman, Duen Horng Chau, Andrew J Medford

Analyzing Time Attributes in Event Sequences (C)

Authors: Jessica Magallanes, Lindsey van Gemeren, Steven Wood, Maria-Cruz Villa-Urriol

Evaluating Alignment Approaches in Superimposed Time-series and Temporal Event-sequence Visualizations (C)

Authors: Yixuan Zhang, Sara Di Bartolomeo, Fangfang Sheng, Holly Jimison, Cody Dunne

THURSDAY, OCTOBER 24

4:10-5:40PM

Room: Ballroom A

Visualization in Medicine

Session Chair: Anna Vilanova

[I] CerebroVis: Designing an Abstract yet Spatially Contextualized Cerebral Arteries Network Visualization (I)

Authors: Aditeya Pandey, Harsh Shukla, Geoffrey S. Young, Lei Qin, Amir A. Zamani, Liangde Hsu, Raymond Huang, Cody Dunne, Michelle A. Borkin

[S] Cohort-based T-SSIM Visual Computing for Radiation Therapy Prediction and Exploration (I)

Authors: Andrew Wentzel, Peter Haula, Timothy Basil Luciani, Baher Elgohari, Hesham Ethalawani, Guadalupe Canahuat, David M. Vock, Clifton David Fuller, G. Elisabeta Marai

[S] DeepOrganNet: On-the-Fly Reconstruction and Visualization of 3D / 4D Lung Models from Single-View Projections by Deep Deformation Network (I)

Authors: Yifan Wang, Zichun Zhong, Jing Hua

[S] Temporal Views of Flattened Mitral Valve Geometries (I)

Authors: Pepe Euler, Sandy Engelhardt, Nils Lichtenberg, Raffaele de Simone, Kai Lawonn

[V] Motion Browser: Visualizing and Understanding Complex Upper Limb Movement Under Obstetrical Brachial Plexus Injuries (I)

Authors: Gromit Yeuk-Yin Chan, Luis Gustavo Nonato, Alice Chu, Preeti Raghavan, Viswanath Aluru, Claudio T. Silva

THURSDAY, OCTOBER 24

4:10-5:40PM

Room: Ballroom B

Words & Documents

Session Chair: Wenwen Dou

[V] LDA Ensembles for Interactive Exploration and Categorization of Behaviors (T)

Authors: Siming Chen, Natalia Andrienko, Gennady Andrienko, Linara Adilova, Jeremie Barlet, Joerg Kindermann, Phong H. Nguyen, Olivier Thonnard, Cagatay Turkey

[I] ShapeWordle: Tailoring Wordles using Shape-aware Archimedean Spirals (I)

Authors: Yunhai Wang, Xiaowei Chu, Kaiyi Zhang, Chen Bao, Xiaotong Li, Jian Zhang, Chi-Wing Fu, Christophe Hurter, Oliver Deussen, Bongshin Lee

[V] Semantic Concept Spaces: Guided Topic Model Refinement using Word-Embedding Projections (I)

Authors: Mennatallah El-Assady, Rebecca Kehlbeck, Christopher Collins, Daniel Keim, Oliver Deussen

[V] VIANA: Visual Interactive Annotation of Argumentation (C)

Authors: Fabian Sperrle, Rita Sevastjanova, Rebecca Kehlbeck, Mennatallah El-Assady

[V] Topic-based Exploration and Embedded Visualizations for Research Idea Generation (T)

Authors: Hua Guo, David H. Laidlaw

[I] An Evaluation of Semantically Grouped Word Cloud Designs (T)

Authors: Marti A. Hearst, Emily Pedersen, Lekha Patil, Elsie Lee, Paul Laskowski, Steven Franconeri

THURSDAY, OCTOBER 24

4:10-5:40PM

Room: Ballroom C

What's the Difference?

Session Chair: Michael Correll

[I] The Perceptual Proxies of Visual Comparison (I) (Best Paper Honorable Mention)

Authors: Nicole Jardine, Brian David Ondov, Niklas Elmqvist, Steven Franconeri

[I] BarcodeTree: Scalable Comparison of Multiple Hierarchies (I)

Authors: Guozheng Li, Yu Zhang, Yu Dong, Jie Liang, Jinson Zhang, Jinsong Wang, Michael McGuffin, Xiaoru Yuan

[I] Comparison of Radial and Linear charts for Visualizing Daily Patterns (I)

Authors: Manuela Waldner, Alexandra Diehl, Denis Gracanin, Rainer Splechna, Claudio Delrieux, Kresimir Matkovic

[I] Separating the wheat from the chaff: Comparative visual cues for reliable diagnostics of competing models (I)

Authors: Aritra Dasgupta, Hong Wang, Nancy D O'Brien, Susannah Marie Burrows

[I] Aggregated Dendrograms for Visual Comparison Between Many Phylogenetic Trees (T)

Authors: Zipeng Liu, Shing Hei Zhan, Tamara Munzner

[V] STBins: Visual Tracking and Comparison of Multiple Data Sequences using Temporal Binning (I)

Authors: Ji Qi, Vincent Bloemen, Shihang Wang, Jarke van Wijk, Huub van de Wetering

THURSDAY, OCTOBER 24

4:10-5:40PM

Room: Room 1

Short Papers: Multi-Dimensional Data, Time Series, Graphs, and Trees  
Session Chair: Tobias Schreck

Interpreting Distortions in Dimensionality Reduction by Superimposing Neighbourhood Graphs (C)

Authors: Benoît Colange, Laurent Vuillon, Sylvain Lespinats, Denys Dutykh

Hi-D Maps: An Interactive Visualization Technique for Multi-dimensional Categorical Data. (C)

Authors: Radi Muhammad Reza, Benjamin Watson

Conditional Parallel Coordinates (C)

Authors: Daniel Weidele

Towards Enhancing RadViz Analysis and Interpretation (C)

Authors: Marco Angelini, Graziano Blasilli, Simone Lenti, Alessia Palleschi, Giuseppe Santucci

Time Varying Predominance Tag Maps (C)

Authors: Martin Reckiegel, Stefan Jänicke

SAX Navigator: Time Series Exploration Through Hierarchical Clustering (C)

Authors: Nicholas Ruta, Naoko Sawada, Katy McKeough, Michael Behrisch, Johanna Beyer

Nonuniform Timeslicing of Dynamic Graphs Based on Visual Complexity (C)

Authors: Yong Wang, Daniel Archambault, Hammad Haleem, Torsten Moeller, Yanhong Wu, Huamin Qu

Interactive Bicluster Aggregation in Bipartite Graphs (C)

Authors: Maoyuan Sun, David Koop, Jian Zhao, Chris North, Naren Ramakrishnan

Overlap-Free Drawing of Generalized Pythagoras Trees for Hierarchy Visualization (C)

Authors: Tanja Munz, Michael Burch, Toon van Benthem, Yoeri Poels, Fabian Beck, Daniel Weiskopf

FRIDAY, OCTOBER 25

9:00-10:30AM

Room: Ballroom A

Influencers

Session Chair: Qing Chen

[I] Eiffel: Evolutionary Flow Map for Influence Graph Visualization (T)

Authors: Yucheng Huang, Lei Shi, Yue Su, Yifan Hu, Hanghang Tong, Chaoli Wang, Tong Yang, Deyun Wang, Shuo Liang

[V] Galex: Exploring the Evolution and Intersection of Disciplines (I)

Authors: Zeyu Li, Changhong Zhang, Shichao Jia, Jiawan Zhang

[V] MetricsVis: A Visual Analytics Framework for Evaluating Individual, Team, and Organization Performance (I)

Authors: Jieqiong Zhao, Morteza Karimzadeh, Luke Snyder, Cittayong Surakitbanharn, Zhenyu Cheryl Qian, David Ebert

[V] Influence Flowers of Academic Entities (C)

Authors: Minjeong Shin, Alexander Soen, Benjamin T. Readshaw, Stephen Michael Blackburn, Mitchell Whitelaw, Lexing Xie

[V] WeSeer: Visual Analysis for Better Information Cascade Prediction of WeChat Articles (T)

Authors: Quan Li, Ziming Wu, Lingling Yi, Kristanto Sean N, Huamin Qu, Xiaojuan Ma

[V] R-Map: A Map Metaphor for Visualizing Information Reposting Process in Social Media (I)

Authors: Shuai Chen, Sihang Li, Siming Chen, Xiaoru Yuan

FRIDAY, OCTOBER 25

9:00-10:30AM

Room: Ballroom B

Color

Session Chair: Kenneth Moreland

[I] Color Crafting: Automating the Construction of Designer Quality Color Ramps (I)

Authors: Stephen Smart, Keke Wu, Danielle Albers Szafr

[I] Estimating color-concept associations from image statistics (I)

Authors: Ragini Rathore, Zachary Leggon, Laurent Lessard, Karen Schloss

[I] The Effect of Color Scales on Climate Scientists' Objective and Subjective Performance in Spatial Data Analysis Tasks (T)

Authors: Aritra Dasgupta, Jorge Poco, Bernice Rogowitz, Kyungsik Han, Enrico Bertini, Claudio T. Silva

[S] Measuring and Modeling the Feature Detection Threshold Functions of Colormaps (T)

Authors: Colin Ware, Terece L. Turton, Roxana Bujack, Francesca Samsel, Piyush Shrivastava, David H. Rogers

[S] Measuring the Effects of Scalar and Spherical Colormaps on Ensembles of DMRI Tubes (T)

Authors: Jian Chen, Guohao Zhang, Wesley Chiou, David H. Laidlaw, Alexander P. Auchus

FRIDAY, OCTOBER 25

9:00-10:30AM

Room: Ballroom C

Searching & Querying

Session Chair: Alvia Ottley

[I] Searching the Visual Style and Structure of D3 Visualizations (I)

Authors: Enamul Hoque, Maneesh Agrawala

[I] The Role of Latency in Predicting Visual Search Behavior (I)

Authors: Leilani Battle, R. Jordan Crouser, Audace Nakeshimana, Ananda Montoly, Remco Chang, Michael Stonebraker

[V] A Natural-language-based Visual Query Approach of Uncertain Human Trajectories (I)

Authors: Zhaosong Huang, Ye Zhao, Wei Chen, Shengjie Gao, Kejie Yu, Weixia Xu, Mingjie Tang, Minfeng Zhu, Mingliang Xu

[V] You can't always sketch what you want: Understanding Sensemaking in Visual Query Systems (I)

Authors: Doris Jung-Lin Lee, John Lee, Tarique Siddiqui, Jaewoo Kim, Aditya Parameswaran, Karrie Karahalios

[V] Do What I Mean, Not What I Say! Design Considerations for Supporting Intent and Context in Analytical Conversation (C)

Authors: Melanie Tory, Vidya Setlur

[V] TopicSifter: Interactive Search Space Reduction Through Targeted Topic Modeling (C)

Authors: Hannah Kim, Dongjin Choi, Barry Drake, Alex Endert, Haesun Park

FRIDAY, OCTOBER 25

9:00-10:30AM

Room: Room 1

Short Papers: Scalar, Vector, and Tensor Fields

Session Chair: Bei Wang

Efficient Space Skipping and Adaptive Sampling of Unstructured Volumes using Hardware Accelerated Ray Tracing (C)

Authors: Nate Morrical, Will Usher, Ingo Wald, Valerio Pascucci

Hybrid Grids for Sparse Volume Rendering (C)

Authors: Stefan Zellmann, Deborah Meurer, Ulrich Lang

Data-Driven Colormap Optimization for 2D Scalar Field Visualization (C)

Authors: Qiong Zeng, Yinqiao Wang, Ivan Viola, Wenting Zhang, Jian Zhang, Changhe Tu, Yunhai Wang

Evaluating Gradient Perception in Color-coded Scalar Fields (C)

Authors: Khairi Reda, Michael E. Papka

GalStamps: Analyzing Real and Simulated Galaxy Observations (C)

Authors: Nina McCurdy, Miriah Meyer

Point Movement in a DSL for Higher-Order FEM Visualization (C)

Authors: Teodoro Collin, Charisee Chiw, L. Ridgway Scott, John Reppy, Gordon L. Kindimann

Unsteady Flow Visualization via Physics based Pathline Exploration (C)

Authors: Duong Nguyen, Lei Zhang, Robert S. Laramée, David Thompson, Rodolfo Ostilla Monico, Guoning Chen

Visualization of Symmetries in Fourth-Order Stiffness Tensors (C)

Authors: Chiara Hergl, Thomas Nagel, Olaf Kolditz, Gerik Scheuermann