

2024 IEEE Visualization and Visual Analytics (VIS 2024)

**St. Pete Beach, Florida, USA
13-18 October 2024**



**IEEE Catalog Number: CFP24081-POD
ISBN: 979-8-3503-5486-7**

**Copyright © 2024 by the Institute of Electrical and Electronics Engineers, Inc.
All Rights Reserved**

Copyright and Reprint Permissions: Abstracting is permitted with credit to the source. Libraries are permitted to photocopy beyond the limit of U.S. copyright law for private use of patrons those articles in this volume that carry a code at the bottom of the first page, provided the per-copy fee indicated in the code is paid through Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923.

For other copying, reprint or republication permission, write to IEEE Copyrights Manager, IEEE Service Center, 445 Hoes Lane, Piscataway, NJ 08854. All rights reserved.

****** This is a print representation of what appears in the IEEE Digital Library. Some format issues inherent in the e-media version may also appear in this print version.***

IEEE Catalog Number:	CFP24081-POD
ISBN (Print-On-Demand):	979-8-3503-5486-7
ISBN (Online):	979-8-3503-5485-0
ISSN:	2771-9537

Additional Copies of This Publication Are Available From:

Curran Associates, Inc
57 Morehouse Lane
Red Hook, NY 12571 USA
Phone: (845) 758-0400
Fax: (845) 758-2633
E-mail: curran@proceedings.com
Web: www.proceedings.com

CURRAN ASSOCIATES INC.
proceedings
.com

2024 IEEE Visualization and Visual Analytics (VIS) VIS 2024

Table of Contents

Message from the VIS 2024 General Chairs	xiii
VIS 2024 Conference Committee	xiv
VIS 2024 Program Committee	xvii
VIS 2024 Reviewers	xx

Best Papers

Hypertrix: An indicatrix for high-dimensional visualizations	1
<i>Shivam Raval (Harvard University), Fernanda Viégas (Harvard University, Google Research), and Martin Wattenberg (Harvard University, Google Research)</i>	
PyGWalker: On-the-fly Assistant for Exploratory Visual Data Analysis	6
<i>Yue Yu (Hong Kong University of Science and Technology, China and Kanaries Data, China), Leixian Shen (Hong Kong University of Science and Technology), Fei Long (Kanaries Data, China), Huamin Qu (Hong Kong University of Science and Technology, China), and Hao Chen (Kanaries Data, China)</i>	

System design

DaVE - A Curated Database of Visualization Examples	11
<i>Jens Koenen (RWTH Aachen University, Germany), Marvin Petersen (RPTU Kaiserslautern-Landau, Germany), Christoph Garth (RPTU Kaiserslautern-Landau, Germany), and Tim Gerrits (RWTH Aachen University, Germany)</i>	
Counterpoint: Orchestrating Large-Scale Custom Animated Visualizations	16
<i>Venkatesh Sivaraman (Carnegie Mellon University), Frank Elavsky (Carnegie Mellon University), Dominik Moritz (Carnegie Mellon University), and Adam Perer (Carnegie Mellon University)</i>	
Visualizing an Exascale Data Center Digital Twin: Considerations, Challenges and Opportunities	21
<i>Matthias Maiterth (Oak Ridge National Laboratory), Wesley Brewer (Oak Ridge National Laboratory), Dane de Wet (Oak Ridge National Laboratory), Scott Greenwood (Oak Ridge National Laboratory), Vineet Kumar (Oak Ridge National Laboratory), Jesse Hines (Oak Ridge National Laboratory), Sedrick Bouknight (Oak Ridge National Laboratory), Zhe Wang (Oak Ridge National Laboratory), Tim Dykes (Hewlett Packard Enterprise), and Feiyi Wang (Oak Ridge National Laboratory)</i>	

Guided Statistical Workflows with Interactive Explanations and Assumption Checking	26
<i>Yuqi Zhang (New York University), Adam Perer (Carnegie Mellon University), and Will Epperson (Carnegie Mellon University)</i>	
FCNR: Fast Compressive Neural Representation of Visualization Images	31
<i>Yunfei Lu (University of Notre Dame, USA), Pengfei Gu (University of Notre Dame, USA), and Chaoli Wang (University of Notre Dame, USA)</i>	
Groot: A System for Editing and Configuring Automated Data Insights	36
<i>Sneha Gathani (University of Maryland, College Park), Anamaria Crisan (Tableau Research), Vidya Setlur (Tableau Research), and Arjun Srinivasan (Tableau Research)</i>	
Visualizations on Smart Watches while Running: It Actually Helps!	41
<i>Sarina Kashanj (University of Victoria), Xiyao Wang (University of Victoria), and Charles Perin (University of Victoria)</i>	
Micro Visualizations on a Smartwatch: Assessing Reading Performance While Walking	46
<i>Fairouz Grioui (University of Stuttgart), Tanja Blascheck (University of Stuttgart), Lijie Yao (Université Paris-Saclay CNRS, Inria, LISN, France & Xi'an Jiaotong-Liverpool University, China), and Petra Isenberg (Université Paris-Saclay CNRS, Inria, LISN, France)</i>	

Analytics and Applications

FAVis: Visual Analytics of Factor Analysis for Psychological Research	51
<i>Yikai Lu (University of Notre Dame, USA) and Chaoli Wang (University of Notre Dame, USA)</i>	
Data Guards: Challenges and Solutions for Fostering Trust in Data	56
<i>Nicole Sultanum (Tableau Research, USA), Dennis Bromley (Tableau Research, USA), and Michael Correll (Northeastern University, USA)</i>	
AltGeoViz: Facilitating Accessible Geovisualization	61
<i>Chu Li (University of Washington, USA), Rock Yuren Pang (University of Washington, USA), Ather Sharif (University of Washington, USA), Arnavi Chheda-Kothary (University of Washington, USA), Jeffrey Heer (University of Washington, USA), and Jon E Froehlich (University of Washington, USA)</i>	
"Must Be a Tuesday": Affect, Attribution, and Geographic Variability in Equity-Oriented Visualizations of Population Health Disparities	66
<i>Eli Holder (3iap) and Lace Padilla (Northeastern)</i>	
Demystifying Spatial Dependence: Interactive Visualizations for Interpreting Local Spatial Autocorrelation	71
<i>Lee Mason (National Cancer Institute / Queen's University Belfast), Blánaid Hicks (Queen's University Belfast), and Jonas Almedia (National Cancer Institute)</i>	
Two-point Equidistant Projection and Degree-of-interest Filtering for Smooth Exploration of Geo-referenced Networks	76
<i>Max Franke (University of Stuttgart), Samuel Beck (University of Stuttgart), and Steffen Koch (University of Stuttgart)</i>	

Bringing Data into the Conversation: Adapting Content from Business Intelligence Dashboards for Threaded Collaboration Platforms	81
<i>Hyeok Kim (Northwestern University), Arjun Srinivasan (Tableau Research), and Matthew Brehmer (University of Waterloo)</i>	
The Comic Construction Kit: An Activity for Students to Learn and Explain Data Visualizations	86
<i>Magdalena Boucher (St. Pölten University of Applied Sciences, Austria), Christina Stoiber (St. Pölten University of Applied Sciences, Austria), Mandy Keck (University of Applied Sciences Upper Austria), Victor Adriel de Jesus Oliveira (St. Pölten University of Applied Sciences, Austria), and Wolfgang Aigner (St. Pölten University of Applied Sciences, Austria)</i>	

AI and LLM

ImageSI: Semantic Interaction for Deep Learning Image Projections	91
<i>Jiayue Lin (Virginia Tech), Rebecca Faust (Tulane University), and Chris North (Virginia Tech)</i>	
Diffusion Explainer: Visual Explanation for Text-to-image Stable Diffusion	96
<i>Seongmin Lee (Georgia Tech, USA), Benjamin Hoover (Georgia Tech, USA; IBM Research, USA), Hendrik Strobelt (IBM Research), Zijie J. Wang (Georgia Tech), ShengYun Peng (Georgia Tech), Austin Wright (Georgia Tech), Kevin Li (Georgia Tech), Haekyu Park (Georgia Tech), Haoyang Yang (Georgia Tech), and Duen Horng Chau (Georgia Tech)</i>	
A Two-Phase Visualization System for Continuous Human-AI Collaboration in Sequelae Analysis and Modeling	101
<i>Yang Ouyang (School of Information Science and Technology, ShanghaiTech University), Chenyang Zhang (Department of Computer Science, University of Illinois at Urbana-Champaign), He Wang (School of Information Science and Technology, ShanghaiTech University), Tianle Ma (Zhongshan Hospital Fudan University), Chang Jiang (Zhongshan Hospital Fudan University), Yuheng Yan (Zhongshan Hospital Fudan University), Zuoqin Yan (Zhongshan Hospital Fudan University), Xiaojuan Ma (Hong Kong University of Science and Technology), Chuhan Shi (Southeast University), and Quan Li (School of Information Science and Technology, ShanghaiTech University)</i>	
Can GPT4 Models Detect Misleading Visualizations?	106
<i>Jason Alexander (University of Massachusetts Amherst, USA), Priyal Nanda (University of Massachusetts Amherst, USA), Kai-Cheng Yang (Network Science Institute, Northeastern University, USA), and Ali Sarvaghad (University of Massachusetts Amherst, USA)</i>	
Intuitive Design of Deep Learning Models through Visual Feedback	111
<i>JunYoung Choi (VIENCE Inc., Republic of Korea), Sohee Park (VIENCE Inc., Republic of Korea), GaYeon Koh (Korea University, Republic of Korea), Youngseo Kim (VIENCE Inc., Republic of Korea), and Won-Ki Jeong (VIENCE Inc., Republic of Korea)</i>	

LinkQ: An LLM-Assisted Visual Interface for Knowledge Graph Question-Answering	116
<i>Harry Li (MIT Lincoln Laboratory), Gabriel Appleby (Tufts University), and Ashley Suh (MIT Lincoln Laboratory)</i>	
Bavisitter: Integrating Design Guidelines into Large Language Models for Visualization Authoring	121
<i>Jiwon Choi (Sungkyunkwan University), Jaeung Lee (Sungkyunkwan University), and Jaemin Jo (Sungkyunkwan University)</i>	
Exploring the Capability of LLMs in Performing Low-Level Visual Analytic Tasks on SVG Data Visualizations	126
<i>Zhongzheng Xu (Brown University) and Emily Wall (Emory University)</i>	

Graph, Hierarchy and Multidimensional

On Combined Visual Cluster and Set Analysis	131
<i>Nikolaus Piccolotto (TU Wien), Markus Wallinger (TU Wien), Silvia Mijsch (TU Wien), and Markus Bögl (TU Wien)</i>	
An Overview + Detail Layout for Visualizing Compound Graphs	136
<i>Chang Han (The University of Utah, USA), Justin Lieffers (The University of Arizona, USA), Clayton Morrison (The University of Arizona, USA), and Katherine Isaacs (The University of Utah, USA)</i>	
Improving Property Graph Layouts by Leveraging Attribute Similarity for Structurally Equivalent Nodes	141
<i>Patrick Mackey (Pacific Northwest National Laboratory), Jacob Miller (Pacific Northwest National Laboratory), and Liz Faultersack (Pacific Northwest National Laboratory)</i>	
Fields, Bridges, and Foundations: How Researchers Browse Citation Network Visualizations	146
<i>Kiroong Choe (Seoul National University), Eunhye Kim (Seoul National University), Sangwon Park (Seoul National University), and Jinwook Seo (Seoul National University)</i>	
Feature Clock: High-Dimensional Effects in Two-Dimensional Plots	151
<i>Olga Ovcharenko (ETH Zurich), Rita Sevastjanova (ETH Zurich), and Valentina Boeva (ETH Zurich)</i>	
Uniform Sample Distribution in Scatterplots via Sector-based Transformation	156
<i>Hennes Rave (University of Münster, Germany), Vladimir Molchanov (University of Münster, Germany), and Lars Linsen (University of Münster, Germany)</i>	
GhostUMAP: Measuring Pointwise Instability in Dimensionality Reduction	161
<i>Myeongwon Jung (Sungkyunkwan University), Takanori Fujiwara (Linköping University), and Jaemin Jo (Sungkyunkwan University)</i>	
Use-Coordination: Model, Grammar, and Library for Implementation of Coordinated Multiple Views	166
<i>Mark S. Keller (Harvard Medical School), Trevor Manz (Harvard Medical School), and Nils Gehlenborg (Harvard Medical School)</i>	

Scientific and Immersive Visualization

Accelerating Transfer Function Update for Distance Map based Volume Rendering	171
<i>Michael Rauter (University of Applied Sciences Wiener Neustadt, Austria), Lukas Zimmermann (Medical University of Vienna, Austria), and Markus Zeilinger (University of Applied Sciences Wiener Neustadt, Austria)</i>	
A Ridge-based Approach for Extraction and Visualization of 3D Atmospheric Fronts	176
<i>Anne Gossing (Zuse Institute Berlin, Germany), Andreas Beckert (Universität Hamburg, Germany), Christoph Fischer (Universität Hamburg, Germany), Nicolas Klenert (Zuse Institute Berlin), Vijay Natarajan (Indian Institute of Science, India), George Pacey (Freie Universität Berlin, Germany), Thorwin Vogt (Universität Hamburg, Germany), Marc Rautenhaus (Universität Hamburg, Germany), and Daniel Baum (Zuse Institute Berlin, Germany)</i>	
Investigating the Apple Vision Pro Spatial Computing Platform for GPU-Based Volume Visualization	181
<i>Camilla Hrycak (University of Duisburg-Essen, Computergraphics and Visualization Group), David Lewakis (University of Duisburg-Essen, Computergraphics and Visualization Group), and Jens Krüger (University of Duisburg-Essen, Computergraphics and Visualization Group)</i>	
A Comparative Study of Neural Surface Reconstruction for Scientific Visualization	186
<i>Siyuan Yao (University of Notre Dame, USA), Weixi Song (Wuhan University, China), and Chaoli Wang (University of Notre Dame, USA)</i>	
Visualization of 2D Scalar Field Ensembles Using Volume Visualization of the Empirical Distribution Function	191
<i>Tomas Daetz (Leipzig University, Germany), Michael Böttinger (German Climate Computing Center, Germany), Geric Scheuermann (Leipzig University, Germany), and Christian Heine (Leipzig University, Germany)</i>	
Text-based transfer function design for semantic volume rendering	196
<i>Sangwon Jeong (Vanderbilt University), Jixian Li (Scientific Computing and Imaging Institute, University of Utah), Shusen Liu (Lawrence Livermore National Laboratory), Chris R. Johnson (Scientific Computing and Imaging Institute, University of Utah), and Matthew Berger (Vanderbilt University)</i>	
Multi-User Mobile Augmented Reality for Cardiovascular Surgical Planning	201
<i>Pratham Darrpan Mehta (Georgia Institute of Technology, USA), Rahul Ozgur Narayanan (Georgia Institute of Technology, USA), Harsha Karanth (Georgia Institute of Technology, USA), Haoyang Yang (Georgia Institute of Technology, USA), Timothy Slesnick (Children's Healthcare of Atlanta, USA), Fawwaz Shaw (Children's Healthcare of Atlanta, USA), and Duen Horng Chau (Georgia Institute of Technology, USA)</i>	
Active Appearance and Spatial Variation Can Improve Visibility in Area Labels for Augmented Reality	206
<i>Hojung Kwon (Brown University, USA), Yuanbo Li (Brown University, USA), Xiaohan Ye (Brown University, USA), Praccho Muna-McQuay (Brown University, USA), Liuren Yin (Duke University, USA), and James Tompkin (Brown University, USA)</i>	

Perception and Representation

Dark Mode or Light Mode? Exploring the Impact of Contrast Polarity on Visualization Performance Between Age Groups	211
<i>Zack While (UMass Amherst) and Ali Sarvghad (UMass Amherst)</i>	
Science in a Blink: Supporting Ensemble Perception in Scalar Fields	216
<i>Victor A. Mateevitsi (Argonne National Laboratory, USA), Michael E. Papka (Argonne National Laboratory, USA), and Khairi Reda (Indiana University Indianapolis)</i>	
Towards a Quality Approach to Hierarchical Color Maps	221
<i>Tobias Mertz (Fraunhofer IGD, Germany) and Jörn Kohlhammer (Fraunhofer IGD, Germany; TU Darmstadt, Germany)</i>	
Assessing Graphical Perception of Image Embedding Models using Channel Effectiveness	226
<i>Soohyun Lee (Seoul National University, Korea), Minsuk Chang (Seoul National University, Korea), Seokhyeon Park (Seoul National University, Korea), and Jinwook Seo (Seoul National University, Korea)</i>	
Connections Beyond Data: Exploring Homophily With Visualizations	231
<i>Poorna Talkad Sukumar (New York University, USA), Maurizio Porfiri (New York University, USA), and Oded Nov (New York University, USA)</i>	
A Literature-based Visualization Task Taxonomy for Gantt Charts	236
<i>Sayef Azad Sakin (University of Utah) and Katherine E. Isaacs (University of Utah)</i>	
Zoomable Level-of-Detail ChartTables for Interpreting Probabilistic Model Outputs for Reactionary Train Delays	241
<i>Aidan Slingsby (City, University of London) and Jonathan Hyde (Risk Solutions)</i>	
Gridlines Mitigate Sine Illusion in Line Charts	246
<i>Cindy Xiong Bearfield (Georgia Tech), Clayton J Knittel (Google), Steven Franconeri (Northwestern University), and Jane Awuah (Georgia Tech)</i>	

Text and Multimedia

Design Patterns in Right-to-Left Visualizations: The Case of Arabic Content	251
<i>Muna Alebri (University College London), Noëlle Rakotoniravony (Worcester Polytechnic Institute), and Lane Harrison (Worcester Polytechnic Institute)</i>	
DASH: A Bimodal Data Exploration Tool for Interactive Text and Visualizations	256
<i>Dennis Bromley (Tableau Research) and Vidya Setlur (Tableau Research)</i>	
Evaluating the Semantic Profiling Abilities of LLMs for Natural Language Utterances in Data Visualization	261
<i>Hannah K. Bako (University of Maryland, USA), Arshnoor Bhutani (University of Maryland, USA), Xinyi Liu (University of Texas at Austin, USA), Kwesi A. Cobbina (University of Maryland, USA), and Zhicheng Liu (University of Maryland, USA)</i>	

Representing Charts as Text for Language Models: An In-Depth Study of Question Answering for Bar Charts	266
<i>Victor Soares Bursztyn (Adobe Research), Jane Hoffswell (Adobe Research), Eunye Koh (Adobe Research), and Shunan Guo (Adobe Research)</i>	
Confides: A Visual Analytics Solution for Automated Speech Recognition Analysis and Exploration	271
<i>Sunwoo Ha (Washington University in St. Louis), Chaehun Lim (Washington University in St. Louis), R. J. Crouser (Smith College), and Alvitta Ottley (Washington University in St. Louis)</i>	
Integrating Annotations into the Design Process for Sonifications and Physicalizations	276
<i>Rhys Sorenson-Graff (Whitman College), S. Sandra Bae (CU Boulder), and Jordan Wirfs-Brock (Whitman College)</i>	
AEye: A Visualization Tool for Image Datasets	281
<i>Florian Grötschla (ETH Zurich), Luca Lanzendörfer (ETH Zurich), Marco Calzavara (ETH Zurich), and Roger Wattenhofer (ETH Zurich)</i>	
Opening the Black Box of 3D Reconstruction Error Analysis with VECTOR	286
<i>Racquel Fygenon (Northeastern University), Kazi Jawad (Weta FX), Isabel Li (Art Center, College of Design), Francois Ayoub (Jet Propulsion Laboratory, California Institute of Technology), Robert G. Deen (Jet Propulsion Laboratory, California Institute of Technology), Scott Davidoff (Jet Propulsion Laboratory, California Institute of Technology), Dominik Moritz (Carnegie Mellon University), and Mauricio Hess-Flores (Jet Propulsion Laboratory, California Institute of Technology)</i>	

Virtual: VIS from Around the World

What Color Scheme is More Effective in Assisting Readers to Locate Information in a Color-Coded Article?	291
<i>Ho Yin Ng (Pennsylvania State University, USA), Zeyu He (Pennsylvania State University, USA), and Ting-Hao Huang (Pennsylvania State University, USA)</i>	
From Graphs to Words: A Computer-Assisted Framework for the Production of Accessible Text Descriptions	296
<i>Qiang Xu (Polytechnique Montréal, Canada) and Thomas Hurtut (Polytechnique Montréal, Canada)</i>	
Design of a Real-Time Visual Analytics Decision Support Interface to Manage Air Traffic Complexity	301
<i>Elmira Zohrevandi (Linköping University, Sweden), Katerina Vrotsou (Linköping University, Sweden), Carl A. L. Westin (Linköping University, Sweden), Jonas Lundberg (Linköping University, Sweden), and Anders Ynnerman (Linköping University, Sweden)</i>	

Building and Eroding: Exogenous and Endogenous Factors that Influence Subjective Trust in Visualization	306
<i>R. Jordan Crouser (Smith College), Syrine Matoussi (Smith College), Lan Kung (Smith College), Saugat Pandey (Washington University in St. Louis), Oen McKinley (Washington University in St. Louis), and Alvitta Ottley (m.oen@wustl.edu)</i>	

Topological Data Analysis

Topological Separation of Vortices	311
<i>Adeel Zafar (University of Houston, USA), Zahra Poorshayegh (University of Houston, USA), Di Yang (University of Houston, USA), and Guoning Chen (University of Houston, USA)</i>	

The Toolboxes of Visualization

Towards Reusable and Reactive Widgets for Information Visualization Research and Dissemination	316
<i>John A. Guerra-Gomez (Northeastern University, USA)</i>	

Motion and Animated Notions

Animating the Narrative: A Review of Animation Styles in Narrative Visualization	321
<i>Vyri Junhan Yang (Louisiana State University, USA) and Mahmood Jasim (Louisiana State University, USA)</i>	

Flow, Topology, and Uncertainty

Curve Segment Neighborhood-based Vector Field Exploration	326
<i>Nguyen Phan (University of Houston) and Guoning Chen (University of Houston)</i>	

Author Index	331
--------------------	-----