

# **2016 IEEE Pacific Visualization Symposium (PacificVis 2016)**

**Taipei, Taiwan  
19 – 22 April 2016**



**IEEE Catalog Number: CFP16APV-POD  
ISBN: 978-1-5090-1452-1**

**Copyright © 2016 by the Institute of Electrical and Electronic 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 publication is a representation of what appears in the IEEE Digital Libraries. Some format issues inherent in the e-media version may also appear in this print version.***

IEEE Catalog Number:	CFP16APV-POD
ISBN (Print-On-Demand):	978-1-5090-1452-1
ISBN (Online):	978-1-5090-1451-4
ISSN:	2165-8765

**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](mailto:curran@proceedings.com)  
Web: [www.proceedings.com](http://www.proceedings.com)

CURRAN ASSOCIATES INC.  
**proceedings**  
.com

# Contents

Sponsors.....	vi
Chair Message.....	vii
IEEE Visualization and Graphics Technical Committee (VGTC).....	ix
Committees.....	x
Reviewers.....	xii
Keynote Speaker: Tamara Munzner .....	xiii
Keynote Speaker: Tzi-Cker Chiueh .....	xiv

## Papers

### Session 1: Perception and Interaction

SepMe: 2002 New Visual Separation Measures .....	1
Michael Aupetit, Michael Sedlmair	
Mathematical Foundations of Arc Length-Based Aspect Ratio Selection.....	9
Fubo Han, Yunhai Wang, Jian Zhang, Oliver Deussen, Baoquan Chen	
Spot-Tracking Lens: A Zoomable User Interface for Animated Bubble Charts.....	16
Yueqi Hu, Tom Polk, Jing Yang, Ye Zhao, Shixia Liu	
Visualizing Knots and Braids with Touchable 3D Manipulatives .....	24
Hui Zhang, Yiwen Zhong, Jade Jiang	

### Session 2: Graph Visualization

Interactive Visual Co-Cluster Analysis of Bipartite Graphs .....	32
Panpan Xu, Nan Cao, Huamin Qu, John Stasko	

### Session 3: Visualization Systems and Applications

A Crowdsourcing System for Integrated and Reproducible Evaluation in Scientific Visualization .....	40
Rickard Englund, Sathish Kottraval, Timo Ropinski	
An Integrated Visualization System for Interactive Analysis of Large, Heterogeneous Cosmology Data.....	48
Annie Preston, Ramyar Ghods, Jinrong Xie, Franz Sauer, Nick Leaf , Kwan-Liu Ma, Esteban Rangel, Eve Kovacs, Katrin Heitmann, Salman Habib	
EnsembleGraph: Interactive Visual Analysis of Spatiotemporal Behaviors in Ensemble Simulation Data .....	56
Qingya Shu, Hanqi Guo, Jie Liang, Limei Che, Junfeng Liu, Xiaoru Yuan	
Rethinking Sensitivity Analysis of Nuclear Simulations with Topology.....	64
Dan Maljovec, Bei Wang, Paul Rosen, Andrea Alfonsi, Giovanni Pastore, Cristian Rabiti, Valerio Pascucci	

### Session 4: Flow Topology Visualization

Topology-Inspired Galilean Invariant Vector Field Analysis.....	72
Roxana Bujack, Mario Hlawitschka, Kenneth I. Joy	

### Session 5: Flow Field Visualization

Efficient Unsteady Flow Visualization with High-Order Access Dependencies .....	80
Jiang Zhang, Hanqi Guo, Xiaoru Yuan	

Comparative Visualization of Multiple Time Surfaces by Planar Surface Reformation..... 88  
Andrea Brambilla, Paolo Angelelli, Øyvind Andreassen, Helwig Hauser

Comparative Visualization of Vector Field Ensembles Based on Longest Common Subsequence ..... 96  
Richen Liu, Hanqi Guo, Jiang Zhang, Xiaoru Yuan

#### Session 6: Molecular Visualization

An Integrated Geometric and Topological Approach to Connecting Cavities in Biomolecules..... 104  
Talha Bin Masood, Vijay Natarajan

Accelerated Visualization of Transparent Molecular Surfaces in Molecular Dynamics ..... 112  
Adam Jurčík, Julius Parulek, Jiří Sochor, Barbora Kozlíková

Interactive Exploration of Atomic Trajectories Through Relative-Angle Distribution and Associated Uncertainties.... 120  
Harsh Bhatia, Attila G. Gyulassy, Valerio Pascucci, Martina Bremer, Mitchell T. Ong, Vincenzo Lordi, Erik W. Draeger,  
John E. Pask, Peer-Timo Bremer

#### Session 7: High Dimensional, Text and Image Visualization

Dimension Reconstruction for Visual Exploration of Subspace Clusters in High-dimensional Data..... 128  
Fangfang Zhou, Juncai Li, Wei Huang, Ying Zhao, Xiaoru Yuan, Xing Liang, Yang Shi

A Visual Analytics Approach to High-Dimensional Logistic Regression Modeling and its Application to an  
Environmental Health Study ..... 136  
Chong Zhang, Jing Yang, F. Benjamin Zhan, Xi Gong, Jean D. Brender, Peter H. Langlois, Scott Barlowe, Ye Zhao

Geo Word Clouds ..... 144  
Kevin Buchin, Daan Creemers, Andrea Lazzarotto, Bettina Speckmann, Jules Wulms

ICLIC: Interactive Categorization of Large Image Collections ..... 152  
Paul van der Corput, Jarke J. van Wijk

#### Session 8: Behavior and Pattern Visualization

Visual Monitoring of Process Runs: An Application Study for Stored Procedures ..... 160  
Matthias Meyer, Fabian Beck, Steffen Lohmann

MovementSlicer: Better Gantt Charts for Visualizing Behaviors and Meetings in Movement Data ..... 168  
Shrey Gupta, Maxime Dumas, Michael J. McGuffin, Thomas Kapler

TravelDiff: Visual Comparison Analytics for Massive Movement Patterns Derived from Twitter..... 176  
Robert Krueger, Guodao Sun, Fabian Beck, Ranghua Liang, Thomas Ertl

## Visualization Notes

#### VIS Notes Session 1: Graph/Network Visualization

Multilayer Graph Edge Bundling ..... 184  
Romain Bourqui, Dino Ienco, Arnaud Sallaberry, Pascal Poncelet

Visualization of Origin-Destination Matrices Using a Connection Barchart and Coordinated Maps..... 189  
Juan C. Ibarra, John A. Triana, José T. Hernández

NetworkSeer: Visual Analysis for Social Network in MOOCs..... 194  
Tongshuang Wu, Yuan Yao, Yuqing Duan, Xinzhi Fan, Huaming Qu

Effects of Curves on Graph Perception..... 199  
Weidong Huang, Peter Eades, Seok-Hee Hong, Henry Been-Lirn Duh

## **VIS Notes Session 2: Surface, Flow, and Motion**

Screen-space Silhouettes for Visualizing Ensembles of 3D Isosurfaces .....	204
Ismail Demir, Johannes Kehrer, Rüdiger Westermann	
Visualizing the Variations of Ensemble of Isosurfaces .....	209
Subhashis Hazarika, Soumya Dutta, Han-Wei Shen	
A Bayesian Approach for Probabilistic Streamline Computation in Uncertain Flows .....	214
Wenbin He, Chun-Ming Chen, Xiaotong Liu, Han-Wei Shen	
A Study of using Motion for Comparative Visualization.....	219
Chien-Hsin Hsueh, Jia-Kai Chou, Kwan-Liu Ma	

## **VIS Notes Session 3: Visual Analytics and Techniques**

A Visual Analytics Approach for Exploring Individual Behaviors in Smartphone Usage Data .....	224
Mingming Lu, Dan Meng, Yanni Peng, Yong Li, Ying Zhao, Fangfang Zhou, Xiaoping Fan	
Visual Analysis of Body Movement in Serious Games for Healthcare .....	229
Oky Purwantiningsih, Arnaud Sallaberry, Sébastien Andary, Antoine Seilles, Jérôme Azé	
STAC: Enhancing Stacked Graph for Time Series Analysis.....	234
Yun Wang, Tongshuang Wu, Zhutian Chen, Qiong Luo, Huamin Qu	
Semantic Word Cloud Generation Based on Word Embeddings .....	239
Jin Xu, Yubo Tao, Hai Lin	

## **VIS Notes Session 4: Design Studies and Applications**

A Design Study of Personal Bibliographic Data Visualization .....	244
Tsai Ling Fung, Jia-Kai Chou, Kwan-Liu Ma	
Bookwall: Visualizing Books Online Based on User Experience in Physical Bookstores.....	249
Hsin-I Chen, Wei-Ting Lin, Bing-Yu Chen	
A Design Study to Identify Inconsistencies in Kinship Information: the Case of the 1000 Genomes Project .....	254
Michaël Aupetit, Ehsan Ullah, Reda Rawi, Halima Bensmail	
Fostering Comparisons: Designing an Interactive Exhibit that Visualizes Marine Animal Behaviors .....	259
Chien-Hsin Hsueh, Jacqueline Chu, Kwan-Liu Ma, Joyce Ma, Jennifer Frazier	