

## Theme Articles

### Big-Data Visualization

#### 20 Guest Editors' Introduction

*Daniel Keim, Huamin Qu, and Kwan-Liu Ma*

#### 22 Customizing Computational Methods for Visual Analytics with Big Data

*Jaegul Choo and Haesun Park*

Computational methods can improve the scalability of visual analytics (VA) by providing compact, meaningful information about the input data. However, the required computation time hinders real-time interactive visualization of big data. By addressing discrepancies between these methods and VA, researchers have proposed ways to customize them for VA.

#### 29 Feature Tracking and Visualization of the Madden-Julian Oscillation in Climate Simulation

*Teng-Yok Lee, Xin Tong, Han-Wei Shen, Pak Chung Wong, Samson Hagos, and L. Ruby Leung*

The Madden-Julian oscillation (MJO) plays a significant role in intraseasonal weather variations over the Indian and Pacific Oceans. Researchers have developed an integrated analysis and visualization tool for simulated MJO episodes. Using a Web-based interface, the tool lets scientists more easily identify cloud and environmental processes associated with the MJO.

#### 38 Visualizing Large, Heterogeneous Data in Hybrid-Reality Environments

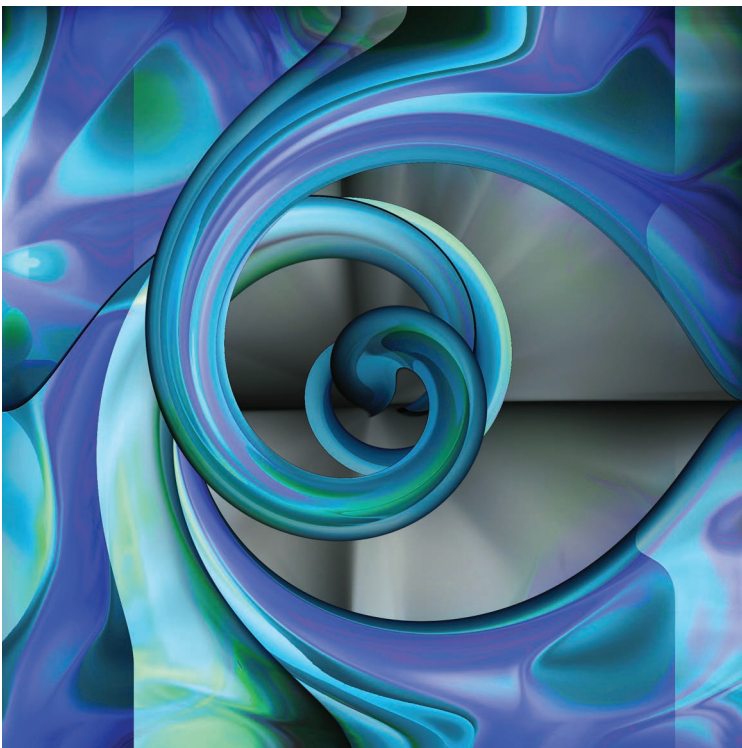
*Khairi Reda, Alessandro Febretti, Aaron Knoll, Jillian Aurisano, Jason Leigh, Andrew Johnson, Michael E. Papka, and Mark Hereld*

Hybrid-reality environments blur the line between traditional virtual environments and tiled display walls. They incorporate high-resolution, stereoscopic displays and can be used to juxtapose a variety of datasets while providing a range of naturalistic interaction schemes. They thus empower designers to construct integrative visualizations that more effectively mash up 2D, 3D, temporal, and multivariate datasets.

#### 50 Exploring the Connectome: Petascale Volume Visualization of Microscopy Data Streams

*Johanna Beyer, Markus Hadwiger, Ali Al-Awami, Won-Ki Jeong, Narayanan Kasthuri, Jeff W. Lichtman, and Hanspeter Pfister*

A system for interactively exploring petavoxel volumes from high-throughput electron microscopy data streams supports concurrent visualization of high-resolution volumes and voxel segmentation data. The visualization-driven system design handles incomplete data and improves scalability over previous approaches. Researchers have employed the system on a 1-teravoxel mouse cortex volume.





## Feature Articles

### 62 Garment Personalization via Identity Transfer

Roy Shilkrot, Daniel Cohen-Or, Ariel Shamir, and Ligang Liu

This system creates a virtual experience akin to trying on clothing. It clones the user's photographic image into a catalog of images of models wearing the desired garments. The process takes into account the user's skin color and body dimensions.

### 73 Extracting Valley-Ridge Lines from Point-Cloud-Based 3D Fingerprint Models

Xufang Pang, Zhan Song, and Wuyuan Xie

Feature detection is a crucial issue in 3D fingerprinting techniques. A new approach extracts the feature of valley-ridge lines from point-cloud-based fingerprint models. Unlike previous means, it doesn't employ unwrapping, which converts 3D models to 2D but can introduce distortions.



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### 88 Applications

#### Visual Matrix Clustering of Social Networks

Pak Chung Wong, Patrick Mackey, Harlan Foote, and Richard May

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#### Beyond Control Panels: Direct Manipulation for Visual Analytics

Alex Endert, Lauren Bradel, and Chris North

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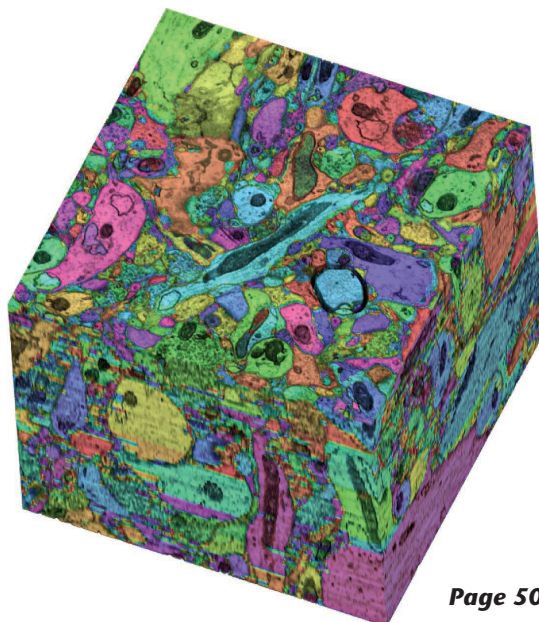
#### How Visualization Courses Have Changed over the Past 10 Years

G. Scott Owen, Gitta Domik, David S. Ebert, Jörn Kohlhammer, Holly Rushmeier, Beatriz Sousa Santos, and Daniel Weiskopf

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#### Methods for Game User Research: Studying Player Behavior to Enhance Game Design

Heather Desurvire and Magy Seif El-Nasr



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