

Guest Editors' Introduction: Special Section on IEEE PacificVis 2020

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THIS special section of the *IEEE Transactions on Visualization and Computer Graphics (TVCG)* presents the five most highly rated papers from the 2020 IEEE Pacific Visualization Symposium (IEEE PacificVis), which was scheduled to be hosted by Tianjin University and held in Tianjin, China, from April 14 to 17, 2020. IEEE PacificVis, sponsored by the IEEE Visualization and Graphics Technical Committee (VGTC), aims to foster greater exchange between visualization researchers and practitioners, especially in the Asia-Pacific region. This forum has grown to be a truly international event, attracting submissions and attendees from many countries not only in the Asia-Pacific but also in Europe, America, and beyond. Thus, IEEE PacificVis is serving the additional purposes of sharing the latest advances in the field of visualization with researchers and practitioners in the region and, also, introducing research developments in the region to the broader international visualization research community.

To ensure the quality of accepted papers, the IEEE PacificVis 2020 Papers Co-Chairs employed a two-stage peer-review process. Each paper was assigned to a primary reviewer and a secondary reviewer from our team of 51 International Program Committee (IPC) members. The primary and secondary reviewers each recruited an additional external reviewer, ensuring a total of at least four reviewers per paper. It was single-blind for IPC members and double-blind for external reviewers. The submissions this year were outstanding, and the symposium accepted 23 full papers out of 96 completed submissions. In cooperation with TVCG, the guest editors, who were Papers Co-Chairs for the symposium, selected and recommended five outstanding papers to TVCG based on the first round of reviews. These five papers, representing the most highly rated of the IEEE PacificVis 2020 full paper program, were accepted directly by TVCG after the authors revised the original manuscripts as required by the minor revision criteria. We give a brief overview of these five papers as follows.

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Point clouds are often labeled in information visualization applications. In “Modeling How Humans Judge Dot-Label Relations in Point Cloud Visualizations,” the authors conduct an online study and report results on how humans judge relationships between labels and dots in such visualizations. They define twelve model classes that combine and weigh visual features in different ways to predict human performance for the judgment task and select stimuli optimized to discriminate between these models. The results of their study identify one model that outperforms the others.

In “Photographic High-Dynamic-Range Scalar Visualization,” the authors propose a photographic method for visualizing scalar high dynamic range (HDR) data. Their method combines perceptually-driven HDR image processing and overlaid glares for highlighting. HDR image processing is achieved by two tone-mapping operators that balance the perception of the overall structure of the data while preserving fine details. Simulated glares are used to make high-value regions more pronounced. Such visualizations can rapidly communicate important information of the data and can be easily and intuitively understood even by non-expert users.

The paper “Touch? Speech? Or Touch and Speech? Investigating Multimodal Interaction for Visual Network Exploration and Analysis” presents results from a user study that investigates new types of interaction for network visualization. The compared interaction modes include both touch interactions and natural language speech input, as well as combinations of both. The employed qualitative evaluation method focuses on an in-depth investigation of 18 users interacting with a network visualization system to solve common network analysis tasks. Overall, the results allow the authors to conclude that users prefer the combination of both complementing input modalities.

The paper “The Sprawlter Graph Readability Metric: Combining Sprawl and Area-aware Clutter” presents a new readability metric for graph drawing. The proposed sprawlter metric, which combines a sprawl metric and an area-aware clutter metric, can track in detail the extent of geometric overlaps between node-node, node-edge, and edge-edge pairs. The metric handles variable-size nodes and explicitly treats metanodes and leaf nodes uniformly. The authors validate the sprawlter metric with synthetic and real-world layouts and show that it can provide a better quality measure by taking into account both clutter and sprawl.

Working together closely with combustion scientists, the authors of the paper “A User-centered Design in Scientific Visualization Targeting Domain Experts” describe

a visualization tool and reflect on the long-term collaboration process. The developed visualization supports both in-situ representations (i.e., showing live results during the simulation) and post hoc analysis of data from combustion simulations. The process included three stages, leading from domain analysis to interactive development and iterative refinement. Different designs were tested and refined until a simplified yet effective design was found. A user study and expert testing concluded the process.

The guest editors would like to thank Klaus Mueller, the Editor-in-Chief of *TVCG*, and Han-Wei Shen, the Associate Editor-in-Chief, for their strong support to the process of taking the best of the IEEE PacificVis 2020 papers as minor revisions to *TVCG*. We also thank the *TVCG* editorial staff for their dedicated efforts and assistance in preparing this special section. Our thanks also go to the IPC and the anonymous reviewers. We thank them for their thoughtful and valuable feedback that resulted in both the high-quality program for the symposium and the papers appearing in this special section. We sincerely hope that you enjoy this sample of the best papers presented at IEEE PacificVis 2020 and consider submitting your work to the IEEE Pacific Visualization Symposium in the future.

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Fabian Beck received the PhD degree in computer science from the University of Trier, Germany in 2013. He is currently an assistant professor of computer science with the University of Duisburg-Essen, Germany. He worked as a postdoctoral researcher at the University of Stuttgart Visualization Research Center (VISUS) and was awarded with the EuroVis 2018 Young Researcher Award. His research interests include methods for visualizing graphs and hierarchies, software visualization, visual analytics, and interactive documents.

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