

Perception, Visual Inference, and Exploratory Visualization

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In addition to announcing the Best Paper and Best Associate Editor awards, we thank the outgoing Editorial Board members for their service and introduce their replacements. Finally, we outline the articles published in this New Year's issue.

This past year was another challenging one that we would all like to get behind us. For the magazine, however, it has been a good year. We had a number of successful issues, and due to a much-increased page budget, we were able to publish many more exciting articles and to shorten our queue. As usual, we are starting the New Year with a queue issue. It features seven articles that cover a diverse range of topics related to perception, visual inferences from images, and exploratory visualization. We also have a number of exciting topics lined up for the rest of the year, including machine learning approaches in manufacturing in March/April 2022, big data visualization in May/June 2022, multilevel graph representations for big data in science in July/August 2022, an explainability issue in September/October, and a pandemic issue in November/December. Many of the calls for papers are still open. Please consider contributing.

We also presented three *IEEE Computer Graphics and Applications* (CG&A) articles at the International Symposium on Mixed and Augmented Reality (ISMAR) and 12 articles at the IEEE Visualization conference. Congratulations to these authors. We will continue to expand our collaboration with these conferences.

BEST PAPER AWARD 2020

The objective of the Best Paper Award, fully sponsored by the IEEE Computer Society (CS) and initiated by the CS Publications Board in 2019, is to acknowledge and reward the best articles published in the previous year. The selection of the 2020 IEEE CG&A Best Paper Award was conducted by a committee chaired by the Associate Editor-in-Chief, Richard Zhang. The

committee members include Miriah Meyer, a Professor from Linköping University, and Xin Tong, a Principal Researcher from Microsoft Research Asia. All of the peer-reviewed articles published in 2020 whether submitted through theme issues or in the regular queue issues were reviewed by the committee, which made its recommendations to Editor-in-Chief, Torsten Möller. The Editor-in-Chief then sent his recommendation to the IEEE Computer Society Publications Board. The 2020 winner, as conferred by the Publications Board, is Dietmar Offenhuber, "What We Talk About When We Talk About Data Physicality," *IEEE Computer Graphics and Applications*, vol. 40, no. 6, pp. 25–37, November/December 2020 (<https://www.computer.org/csdl/magazine/cg/2020/06/09198117/1n8WRM3WCAg>).

The author, Dietmar Offenhuber, is an Associate Professor from Northeastern University. The awarded article was part of the IEEE CG&A Special Issue on Data Physicalization. It puts forth a provocative and well-sourced argument about different ways to think about what *data* is. The nominating committee member remarked that a lot was learned from reading the article and it can be seen as one of those rare, epistemology articles in the visualization community that encourages broader thinking and considerations.

An additional article was recognized by the committee as a runner-up for the 2020 Award: Konstantinos Koumaditis, Francesco Chinello, Panagiotis Mitkidis, and Simon Karg, "Effectiveness of Virtual Versus Physical Training: The Case of Assembly Tasks, Trainer's Verbal Assistance, and Task Complexity," *IEEE Computer Graphics and Applications*, vol. 40, no. 5, pp. 41–56, September/October 2020 (<https://www.computer.org/csdl/magazine/cg/2020/05/09130859/1l6OFwFFlcY>).

This article was published as part of the Special Issue on Collaborating and Learning in Shared Virtual Environments. The authors are all from Aarhus

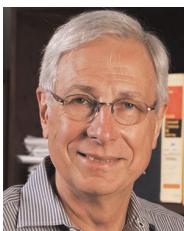
University. This article studies the effectiveness of physical training and virtual training for an object assembly task. The results obtained show that physical training provides better efficiency. As VR has been used more and more frequently in training tasks, this article provides a timely and quality study and should inspire more work along this direction to explore the underlying reasons of the gap between physical training and virtual training and improve the latter.

BEST ASSOCIATE EDITOR AWARD



In recognizing excellence among those serving CG&A as an Associate Editor over the period of 2020–2021, we are happy to present to three of our colleagues with the Best Associate Editor Award. The awardees are Gilles Bailly, a CNRS Researcher at the ISIR Laboratory of Sorbonne Université, Philip Chi-Wing Fu, a Professor at the Chinese University of Hong Kong, and Christopher Collins, a Canada Research Chair in Linguistic Information Visualization and Associate Professor at Ontario Tech University. The Best Associate Editor Awards were selected based on the quality, timeliness, and volume of the reviews performed. It is also worth mentioning that Philip Fu served on the committee for selecting the 2019 Best Paper Award for CG&A. Congratulations to Gilles, Philip, and Christopher for a job well done!

CHANGES IN THE EDITORIAL BOARD



First and most of all, it is with regret that I have to announce that Jim Foley is retiring from his role as Department Editor of "Dissertation Impact." I don't have to introduce Jim to anyone. I, just like many of you, grew up with the "Foley-van-Dam" computer graphics bible. But, he didn't just receive SIGGRAPH's most prestigious Steven A. Coons Award, he also received a SIGCHI Lifetime Achievement Award. That shows his depth

and breadth! Most of all, he has been on the Editorial Board of CG&A since 1984(!), just a couple of years after the formation of our magazine. He rejoined the Editorial Board in 2014 to start the "Dissertation Impact" department. He was also a founding member of the CG&A Advisory Board (which he remains a member of), and I am most grateful for his dedication to the magazine, and to a broad set of topics from graphics to HCI to Vis to VR. Thank you for your service, Jim!



I am glad to announce that Sumanta Pattanaik is taking over the department from Jim. Sumanta is an Associate Professor of Computer Science at the University of Central Florida's College of Engineering and Computer Science. His research interests include realistic-image synthesis, real-time rendering, and data visualization. Sumanta has a Ph.D. degree in computer science from the Birla Institute of Technology and Science.



I would also like to thank Christian Sandor for his services as a co-editor for the "Spatial Interfaces" department. He has passed the baton to Mark Billinghurst, whom we warmly welcome!



Mark Billinghurst is a Professor at the University of South Australia, Adelaide, Australia, and also at the University of Auckland in New Zealand, directing the Empathic Computing Laboratory in both places. He is the Associate Director of the Australian Research Centre for Interactive and Virtual Environments (IVE) at the University of South Australia, and the Director of the Australasian Researchers in Interactive Virtual Environments (ARIVE) research network. He received a Ph.D. degree in 2002 from the University of Washington and researches how virtual and real worlds can be merged, publishing more than 550 articles on augmented reality, remote collaboration, virtual reality, empathic computing, and related topics. In 2013, he was elected as a Fellow of the Royal Society of New Zealand. He was the recipient of the IEEE ISMAR Career Impact Award, the IEEE VGTC Virtual/Augmented Reality Career Award, the IEEE VR 2013

Technical Achievement Award, and the IEEE ISMAR 2012 10 Year Lasting Impact Award.

IN THIS ISSUE

Two of the articles in this issue pose intriguing questions about human perceptions of 3-D shapes. In "Learning Perceptual Aesthetics of 3-D Shapes From Multiple Views," the authors propose a data-driven approach to quantify aesthetic qualities of 3-D shapes via crowdsourcing, where human preference data were collected over multiview images of the shapes. In an exploration of "perceived comfort" over computer generated characters, the authors of the second article asked the question, "Is the perceived comfort with [computer graphics] characters increasing with their novelty?" Their article reports a study of perception related to the charisma, familiarity, and novelty of computer graphics characters.

The article "Real-to-Synthetic Feature Transform for Illumination Invariant Camera Localization" strives to reduce the gap between real and synthetic images to improve the robustness of camera localization algorithms, where a fully connected neural network was trained to perform a real-to-synthetic feature transform. In "Segmentation and Recognition of Offline Sketch Scenes Using Dynamic Programming," the authors tackle the problem of sketch recognition by leveraging a novel method, via dynamic programming, to infer sketch stroke ordering.

In "Talking Realities: Audio Guides in Virtual Reality Visualizations," the authors introduce a

data-driven method to add audio narration to enhance exploratory and immersive data visualization in a virtual reality setting. Specifically, the audio explanation was automatically produced via template-based natural language generation, adapting to the data being explored as well as to the user interactions. Also, in the realm of exploratory visual analytics, the article "BitConduite: Exploratory Visual Analysis of Entity Activity on the Bitcoin Network" presents an approach to visualize and analyze financial activity data within the Bitcoin network. This visual analysis tool is aimed at making Bitcoin data and related financial activities accessible to nontechnical experts. Finally, in "Braid Plot—A Mixed Palette Plotting Method as an Extension of Contour Plot," a new method for plotting 3-D data is proposed that is based on the use of mixed hue palettes, making it possible to distinguish simultaneously both huge and subtle changes in the value of the presented quantity at the same plot. Compared to classical continuous-contour plots, the new method, coined Braid Plot, facilitates the detection of weak perturbation effects or subtle oscillations of the spectral density function to improve the data visualization.

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