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PROCEEDINGS

Visualization and Data Analysis 2021

Editors: **Thomas Wischgoll,** Wright State University (United States),
David Kao, NASA Ames Research Center (United States),
Yi-Jen Chiang, New York University (United States)

These papers represent the program of Electronic Imaging 2021, held online 11–28 January 2021.

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Visualization and Data Analysis 2021

Conference overview

The Conference on Visualization and Data Analysis (VDA) 2021 covers all research and development and application aspects of data visualization and visual analytics. Since the first VDA conference was held in 1994, the annual event has served as a major venue for visualization researchers and practitioners from around the world to present their work and share their experiences.

Award

Kostas Pantazos Memorial Award for Outstanding Paper

Paper authors listed as of 1 January 2021; refer to manuscript for final authors. Titles that are not listed with the proceedings files were presentation-only.

Visualization and Data Analysis 2021

TUESDAY 19 JANUARY 2021

PLENARY: DEEP INTERNAL LEARNING—DEEP LEARNING WITH ZERO EXAMPLES

Session Chair: Charles Bouman, Purdue University (United States)
10:00 – 11:10

Deep internal learning—Deep learning with zero examples
Michal Irani, *professor, Department of Computer Science and Applied Mathematics, Weizmann Institute of Science (Israel)*

Michal Irani is a professor at the Weizmann Institute of Science. Her research interests include computer vision, AI, and deep learning. Irani's prizes and honors include the Maria Petrou Prize (2016), the Helmholtz "Test of Time Award" (2017), the Landau Prize in AI (2019), and the Rothschild Prize in Mathematics and Computer Science (2020). She also received the ECCV Best Paper Awards (2000 and 2002), and the Marr Prize Honorable Mention (2001 and 2005).

THURSDAY 21 JANUARY 2021

PLENARY: THE DEVELOPMENT OF INTEGRAL COLOR IMAGE SENSORS AND CAMERAS

Session Chair: Jonathan B. Phillips, Google Inc. (United States)
10:00 – 11:10

The development of integral color image sensors and cameras
Kenneth A. Parulski, *expert consultant: mobile imaging (United States)*

Kenneth Parulski is an expert consultant to mobile imaging companies and leads the development of ISO standards for digital photography. He joined Kodak in 1980 after graduating from MIT and retired in 2012 as research fellow and chief scientist in Kodak's digital photography division. His work has been recognized with a Technical Emmy and other major awards. Parulski is a SMPTE fellow and an inventor on more than 225 US patents.

MONDAY 25 JANUARY 2021

PLENARY: MAKING INVISIBLE VISIBLE

Session Chair: Jonathan B. Phillips, Google Inc. (United States)
10:00 – 11:10

Making invisible visible
Ramesh Raskar, associate professor, MIT Media Lab (United States)

Ramesh Raskar is an associate professor at MIT Media Lab and directs the Camera Culture research group. His focus is on AI and imaging for health and sustainability. They span research in physical (e.g., sensors, health-tech), digital (e.g., automated and privacy-aware machine learning), and global (e.g., geomaps, autonomous mobility) domains. He received the Lemelson Award (2016), ACM SIGGRAPH Achievement Award (2017), DARPA Young Faculty Award (2009), Alfred P. Sloan Research Fellowship (2009), TR100 Award from MIT Technology Review (2004), and Global Indus Technovator Award (2003). He has worked on special research projects at Google [X] and Facebook and cc-founded/advised several companies.

WEDNESDAY 27 JANUARY 2021

PLENARY: REVEALING THE INVISIBLE TO MACHINES WITH NEUROMORPHIC VISION SYSTEMS: TECHNOLOGY AND APPLICATIONS OVERVIEW

Session Chair: Radka Tezaur, Intel Corporation (United States)
10:00 – 11:10

Revealing the invisible to machines with neuromorphic vision systems: Technology and applications overview
Luca Verre, *CEO and cc-founder, Prophesee (France)*

Luca Verre is cc-founder and CEO of Prophesee, the inventor of the world's most advanced neuromorphic vision systems. Verre is a World Economic Forum technology pioneer. His experience includes project and product management, marketing, and business develcpment roles at Schneider Electric. Prior to Schneider Electric, Verre worked as a research assistant in photonics at the Imperial College of London. Verre holds a MSc in physics, electronic and industrial engineering from Politecnico di Milano and Ecole Centrale and an MBA from Institut Européen d'Administration des Affaires, INSEAD.

THURSDAY 28 JANUARY 2021

CONFERENCE INTERACTIVE POSTER

12:45 – 13:15

VDA-319

VDA POSTER: Data visualization and analysis of playing styles in tennis, *Shiraj Pokharel and Ying Zhu, Georgia State University (United States)*

AR VISUALIZATION AND VISUAL ANALYTICS

Moderator: Yi-Jen Chiang, New York University (United States) / **Session Chair:** David Kao, NASA Ames Research Center (United States)
13:15 – 14:15

13:15 VDA-304

Using augmented reality to enhance nursing education, *Sadan Suneesh Menon, Thomas Wischgoll, Sharon Farra, and Cindra Holland, Wright State University (United States)*

13:55 VDA-306

JIST-first: Combining visual analytics and machine learning for reverse engineering in assembly quality control, *Patrick Ruediger[1], Felix Claus[1], Bernd Hamann[2], Hans Hagen[1], and Heike Leitte[1]; [1]Technische Universität Kaiserslautern (Germany) and [2]University of California, Davis (United States)*

KEYNOTE: SPATIAL PHENOMENON WITH GEOVISUAL ANALYTICS

Moderator: David Kao, NASA Ames Research Center (United States) / Session Chair: Thomas Wischgoll, Wright State University (United States)

18:15 – 19:15

18:15 VDA-332

KEYNOTE: Exploring spatial phenomenon with geovisual analytics, *Ross Maciejewski, Arizona State University (United States)*

Keynote speaker Ross Maciejewski is an associate professor at Arizona State University in the School of Computing, Informatics & Decision Systems Engineering and director of the Center for Accelerating Operational Efficiency (CAOE) - a Department of Homeland Security Center of Excellence. His primary research interests are in the areas of geographical visualization and visual analytics focusing on homeland security, public health, dietary analysis, social media, criminal incident reports, and the food-energy-water nexus. Maciejewski is a recipient of an NSF CAREER Award (2014) and was named a Fulton Faculty Exemplar (2017) and Global Security Fellow at Arizona State. His work has been recognized through a variety of awards at the IEEE Visual Analytics Contest (2010, 2013, 2015), a best paper award in EuroVis 2017, and a CHI Honorable Mention Award in 2018.

CONFERENCE DEMONSTRATION

19:15 – 19:45

VDA-329D

VDA DEMO: "Testing the value of salience in statistical graphs", *Mark Livingston[1], Laura Matzen[2], Derek Brock[1], Andre Harrison[1], and Jonathan Decker[1]; [1]US Naval Research Laboratory and [2]Sandia National Laboratories (United States)*

In the VDA demo, augmenting the oral presentation of the same title, Mark Livingston will show the details of the user study with 54 questions. There is not time in a presentation to show all stimuli, so Livingston plans to use the demonstration to show all stimuli and people can discuss the designs.

INFORMATION & VOLUME VISUALIZATION

Moderator: Thomas Wischgoll, Wright State University (United States) / **Session Chair:** Yi-Jen Chiang, New York University (United States)
19:45 – 20:45

19:45 VDA-329
Testing the value of salience in statistical graphs, *Mark Livingston[1], Laura Matzen[2], Derek Brock[1], Andre Harrison[3], and Jonathan Decker[1]; [1]US Naval Research Laboratory, [2]Sandia Naticnal Laboratories, and [3]US Army Research Laboratory (United States)*

20:05 VDA-330
A visual analytics approach for anomaly detection from a novel traffic light data, *Glenn Turner, Yunpeng Zhang, and Guoning Chen, University of Houston (United States)*

20:25 VDA-331
Volume data segmentation using visual selection, *Shyh-Kuang Ueng and Hsin-Cheng Huang, National Taiwan Ocean University (Taiwan)*