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Table of Contents

Table of Contents	iii
Partners and Sponsors	v
International Program Committee	vii
Author Index	viii
Keynotes	ix
Feature Analysis	
Interactive Classification of Multi-Shell Diffusion MRI With Features From a Dual-Branch CNN Autoencoder	1
<i>Agajan Torayev and Thomas Schultz</i>	
Feature Exploration using Local Frequency Distributions in Computed Tomography Data	13
<i>Martin Falk, Patric Ljung, Claes Lundström, Anders Ynnerman, and Ingrid Hotz</i>	
VR Applications	
An Endoscope Interface for Immersive Virtual Reality	25
<i>Nigel W. John, Thomas W. Day, and Terrence Wardle</i>	
VRIDAA: Virtual Reality Platform for Training and Planning Implantations of Occluder Devices in Left Atrial Appendages	31
<i>Elodie Medina, Ainhoa M. Aguado, Jordi Mill, Xavier Freixa, Dabit Arzamendi, Carlos Yagüe, and Oscar Camara</i>	
The Virtual Reality Flow Lens for Blood Flow Exploration	37
<i>Benjamin Behrendt, Lisa Piotrowski, Sylvia Saalfeld, Bernhard Preim, and Patrick Saalfeld</i>	
Learning Hand Anatomy with Sense of Embodiment	43
<i>Patrick Saalfeld, Aylin Albrecht, Wolfgang D'Hanis, Hermann-Josef Rothkötter, and Bernhard Preim</i>	
VR Acrophobia Treatment - Development of Customizable Acrophobia Inducing Scenarios	49
<i>Sebastian Wagner, Kay Illner, Matthias Weber, Bernhard Preim, and Patrick Saalfeld</i>	
Student and Teacher Meet in a Shared Virtual Reality: A one-on-one Tutoring System for Anatomy Education	55
<i>Patrick Saalfeld, Anna Schmeier, Wolfgang D'Hanis, Hermann-Josef Rothkötter, and Bernhard Preim</i>	
Joint Session DAGM GCPR - VMV - VCBM	
InShaDe: Invariant Shape Descriptors for Visual Analysis of Histology 2D Cellular and Nuclear Shapes	61
<i>Marco Agus, Khaled Al-Thelaya, Corrado Cali, Marina M. Boido, Yin Yang, Giovanni Pintore, Enrico Gobbetti, and Jens Schneider</i>	

Table of Contents

VA and Uncertainty

- Visual Analysis of Multivariate Intensive Care Surveillance Data 71
Nicolas Brich, Christoph Schulz, Jörg Peter, Wilfried Klingert, Martin Schenk, Daniel Weiskopf, and Michael Krone
- GLANCE: Visual Analytics for Monitoring Glaucoma Progression 85
Astrid van den Brandt, Mark Christopher, Linda M. Zangwill, Jasmin Rezapour, Christopher Bowd, Sally L. Baxter, Derek S. Welsbie, Andrew Camp, Sasan Moghimi, Jiun L. Do, Robert N. Weinreb, Chris C. P. Snijders, and Michel A. Westenberg
- Uncertainty-aware Brain Lesion Visualization 97
Christina Gillmann, Dorothee Saur, Thomas Wischgoll, Karl-Titus Hoffmann, Hans Hagen, Ross Maciejewski, and Gerek Scheuermann

Proteins

- Analyzing Protein Similarity by Clustering Molecular Surface Maps 103
Karsten Schatz, Florian Frieß, Marco Schäfer, Thomas Ertl, and Michael Krone
- Real-Time Visualization of 3D Amyloid-Beta Fibrils from 2D Cryo-EM Density Maps 115
Hannah Kniesel, Timo Ropinski, and Pedro Hermosilla

Vascular and Flow

- Aneulysis - A System for Aneurysm Data Analysis 127
Monique Meuschke, Ralph Wickenhöfer, Bernhard Preim, and Kai Lawonn
- Interactive Visual Similarity Analysis of Measured and Simulated Multi-field Tubular Flow Ensembles 139
Simon Leistikow, Ali Nahardani, Verena Hoerr, and Lars Linsen
- VirtualDSA++: Automated Segmentation, Vessel Labeling, Occlusion Detection and Graph Search on CT-Angiography Data 151
Florian Thamm, Markus Jürgens, Hendrik Ditt, and Andreas Maier

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Author Index

Aguado, Ainhoa M.	31	Maciejewski, Ross	97
Agus, Marco	61	Maier, Andreas	151
Albrecht, Aylin	43	Medina, Elodie	31
Al-Thelaya, Khaled	61	Meuschke, Monique	127
Arzamendi, Dabit	31	Mill, Jordi	31
Baxter, Sally L.	85	Moghimi, Sasan	85
Behrendt, Benjamin	37	Nahardani, Ali	139
Boido, Marina M.	61	Peter, Jörg	71
Bowd, Christopher	85	Pintore, Giovanni	61
Brandt, Astrid van den	85	Piotrowski, Lisa	37
Brich, Nicolas	71	Preim, Bernhard	37, 43, 49, 55, 127
Cali, Corrado	61	Rezapour, Jasmin	85
Camara, Oscar	31	Ropinski, Timo	115
Camp, Andrew	85	Rothkötter, Hermann-Josef	43, 55
Christopher, Mark	85	Saalfeld, Patrick	37, 43, 49, 55
Day, Thomas W.	25	Saalfeld, Sylvia	37
D'Hanis, Wolfgang	43, 55	Saur, Dorothee	97
Ditt, Hendrik	151	Schäfer, Marco	103
Do, Jiun L.	85	Schatz, Karsten	103
Ertl, Thomas	103	Schenk, Martin	71
Falk, Martin	13	Scheuermann, Gerik	97
Freixa, Xavier	31	Schmeier, Anna	55
Frieß, Florian	103	Schneider, Jens	61
Gillmann, Christina	97	Schultz, Thomas	1
Gobbetti, Enrico	61	Schulz, Christoph	71
Hagen, Hans	97	Snijders, Chris C. P.	85
Hermosilla, Pedro	115	Thamm, Florian	151
Hoerr, Verena	139	Torayev, Agajan	1
Hoffmann, Karl-Titus	97	Wagner, Sebastian	49
Hotz, Ingrid	13	Wardle, Terrence	25
Illner, Kay	49	Weber, Matthias	49
John, Nigel W.	25	Weinreb, Robert N.	85
Jürgens, Markus	151	Weiskopf, Daniel	71
Klingert, Wilfried	71	Welsbie, Derek S.	85
Kniesel, Hannah	115	Westenberg, Michel A.	85
Krone, Michael	71, 103	Wickenhöfer, Ralph	127
Lawonn, Kai	127	Wischgoll, Thomas	97
Leistikow, Simon	139	Yagüe, Carlos	31
Linsen, Lars	139	Yang, Yin	61
Ljung, Patric	13	Ynnerman, Anders	13
Lundström, Claes	13	Zangwill, Linda M.	85

Keynote

Man against Virus — New Needs for Visual Computing and Visual Communication

Hans-Christian Hege

Zuse Institute Berlin, Germany

Abstract

The fundamental lesson we have learned from the Covid 19 pandemic is that we need to take the threat posed by viruses or, more generally, by infectious disease triggers more seriously than was commonly believed. Science, politics, industry and society have responded to the threat of the SARS-CoV-2 virus in a remarkable way. Many scientific disciplines have contributed their knowledge and methods to answer the countless new questions and find suitable strategies for dealing with the virus.

Visualization, visual communication and visual computing played a very important role in this process: both in analyzing data and communicating facts, and both with experts and the general public as end users. This applies to topics like the course of the pandemic, infection control measures, therapeutic improvements as well as the search for and evaluation of drugs and vaccines. Not to mention the network-based multimedia technologies that made it possible to communicate and interact regardless of location, thus making a significant contribution to problem solving. In the lecture I will present the manifold benefits of visualization techniques and address specific new challenges that are now emerging with regard to the prevention and management of epidemics.

Biographical Note

Hans-Christian Hege is head of the Visual Data Analysis Group at Zuse Institute Berlin (ZIB). After studying physics and mathematics, he performed research in computational physics and quantum field theory at Freie Universität Berlin (1984-1989). Then, he joined ZIB, initially as a scientific consultant for high-performance computing, and then as head of the Department Scientific Visualization (now: Visual and Data-Centric Computing), which he started to build up in 1991. His group performs research in visual data analysis and develops visualization software such as Amira/Avizo. He is also the co-founder of Mental Images (1986) – now NVIDIA Advanced Rendering Center –, Indeed-Visual Concepts (1999) – now Visage Imaging –, and Lenné3D (2005). He has taught as guest professor at Universitat Pompeu Fabra, Barcelona, and as honorary professor at the German Film School (University for Digital Media Production) / Film School Babelsberg. His research interests include visual computing and applications in life sciences, natural sciences and digital humanities. He is a member of ACM, IEEE, Eurographics (elected fellow since 2016), GI, DPG and CURAC.

Keynote

Towards Photorealism

Vladlen Koltun

Intel, Santa Clara, USA

Biographical Note

Vladlen Koltun is the Chief Scientist for Intelligent Systems at Intel. He directs the Intelligent Systems Lab, which conducts high-impact basic research in computer vision, machine learning, robotics, and related areas. He has mentored more than 50 PhD students, postdocs, research scientists, and PhD student interns, many of whom are now successful research leaders.

Keynote

Generative Models for Image Synthesis

Jan Kautz

NVIDIA, Boston, USA

Abstract

Recent progress in generative models and particularly generative adversarial networks (GANs) has been remarkable. They have been shown to excel at image synthesis as well as image-to-image translation problems. I will present a number of our recent methods in this space, which, for instance, can translate images from one domain (e.g., day time) to another domain (e.g., night time) in an unsupervised fashion, synthesize completely new images, and even learn to turn label masks into realistic images.

Biographical Note

Jan leads the Learning & Perception Research team at NVIDIA, working predominantly on computer vision and machine learning problems — from low-level vision (denoising, super-resolution, computational photography), geometric vision (structure from motion, SLAM, optical flow) to high-level vision (detection, recognition, classification), as well as fundamental machine learning algorithms. Before joining NVIDIA in 2013, Jan was a tenured faculty member at University College London. He holds a BSc in Computer Science from University of Erlangen-Nürnberg (1999), an MMath from the University of Waterloo (1999), received his PhD from the Max-Planck-Institut für Informatik (2003), and worked as a post-doc at the Massachusetts Institute of Technology (2003-2006).