

2014 IEEE Virtual Reality

(VR 2014)

**Minneapolis, Minnesota, USA
29 March – 2 April 2014**



**IEEE Catalog Number: CFP14VIR-POD
ISBN: 978-1-4799-2872-9**

Contents

Supporters	viii
Message from the General Chairs.....	ix
Message from the Program Chairs	x
IEEE Visualization and Graphics Technical Committee (VGTC)	xi
Conference Committee.....	xii
International Program Committee.....	xiii
Steering Committee.....	xiii
Paper Reviewers.....	xiv
Keynote Speaker: Henry Fuchs.....	xv
Keynote Speaker: Hunter Hoffman	xvi

Short Papers

Papers 1: Multi-modal & Immersive Displays

Session Chair: Daniel Acevedo Feliz

Stereoscopic Rendering of Virtual Environments with Wide Field-of-Views up to 360°	3
Jérôme Ardouin, Anatole Lécuyer, Maud Marchal, Eric Marchand	
Omegalib: a Multi-View Application Framework for Hybrid Reality Display Environments	9
Alessandro Febretti, Arthur Nishimoto, Victor Mateevitsi, Luc Renambot, Andrew Johnson, Jason Leigh	

Papers 2: Augmented Reality

Session Chair: Takuji Narumi

Efficient and Robust Radiance Transfer for Probeless Photorealistic Augmented Reality	15
Lukas Gruber, Tobias Langlotz, Pradeep Sen, Tobias Höllerer, Dieter Schmalstieg	
Transitional Augmented Reality Navigation For Live Captured Scenes.....	21
Markus Tatzgern, Raphael Grasset, Denis Kalkofen, Dieter Schmalstieg	
Hedgehog Labeling: View Management Techniques for External Labels in 3D Space	27
Markus Tatzgern, Denis Kalkofen, Raphael Grasset, Dieter Schmalstieg	
The Mind-Mirror: See Your Brain in Action in Your Head Using EEG and Augmented Reality.....	33
Jonathan Mercier-Ganady, Fabien Lotte, Emilie Loup-Escande, Maud Marchal, Anatole Lécuyer	

Papers 3: 3D Capturing & Image-based Rendering

Session Chair: Ralf Doerner

Temporally Enhanced 3D Capture of Room-sized Dynamic Scenes with Commodity Depth Cameras.....	39
Mingsong Dou, Henry Fuchs	
Reminiscence Therapy using Image-Based Rendering in VR	45
Emmanuelle Chapoulie, Rachid Guerchouche, Pierre-David Petit, Gaurav Chaurasia, Philippe Robert, George Drettakis	

Papers 5: Usability & Performance

Session Chair: J. Adam Jones

Using Relative Head and Hand-Target Features to Predict Intention in 3D Moving-Target Selection	51
Juan Sebastián Casallas, James H. Oliver, Jonathan W. Kelly, Frédéric Merienne, Samir Garbaya	

The Effectiveness of an AR-based Context-Aware Assembly Support System in Object Assembly.....	57
Bui Minh Khuong, Kiyoshi Kiyokawa, Andrew Miller, Joseph J. LaViola Jr., Tomohiro Mashita, Haruo Takemura	

Posters

An Enhanced Steering Algorithm for Redirected Walking in Virtual Environments.....	65
Mahdi Azmandian, Rhys Yahata, Mark Bolas, Evan Suma	
Time Perception during Walking in Virtual Environments.....	67
Gerd Bruder, Frank Steinicke	
Global Illumination for Augmented Reality on Mobile Phones	69
Michael Csongei, Liem Hoang, Christian Sandor, Yong Beom Lee	
Development of a Kinect-based Anthropometric Measurement Application	71
Alvaro Espitia-Contreras, Pedro Sanchez-Caiman, Alvaro Uribe-Quevedo	
Design and Evaluation of Binaural Auditory Rendering for CAVEs	73
Francesco Grani, Ferran Argelaguet, Valérie Gouranton, Marwan Badawi, Ronan Gaugne, Stefania Serafin, Anatole Lécuyer	
Audio-Visual Attractors for Capturing Attention to the Screens When Walking in CAVE Systems.....	75
Francesco Grani, Ferran Argelaguet, Valérie Gouranton, Marwan Badawi, Ronan Gaugne, Stefania Serafin, Anatole Lécuyer	
A Unique Way to Increase Presence of Mobility Impaired Users - Increasing Confidence in Balance	77
Rongkai Guo, Gayani Samaraweera, John Quarles	
Integration of Road Network Logics into Virtual Environments.....	79
Tobias Haubrich, Sven Seele, Rainer Herpers, Peter Becker	
The Effect of an Occluder on Near Field Depth Matching in Optical See-Through Augmented Reality	81
Chunya Hua, J. Edward Swan II	
Neutrino-KAVE: An Immersive Visualization and Fitting Tool for Neutrino Physics Education.....	83
Elizabeth Izatt, Kate Scholberg, Regis Kopper	
Automated Calibration of Display Characteristics (ACDC) for Head-Mounted Displays and Arbitrary Surfaces	85
J. Adam Jones, Lauren Cairco Dukes, Mark Bolas	
The Effect of Eye Position on the View of Virtual Geometry.....	87
J. Adam Jones, David M. Krum, Mark Bolas	
The Design of a Retinal Resolution Fully Immersive VR Display	89
Anne Kenyon, John van Rosendale, Samuel Fulcomer, David Laidlaw	
Tablet-Based Interaction Panels for Immersive Environments.....	91
David Krum, Thai Phan, Lauren Cairco Dukes, Peter Wang, Mark Bolas	
Real-time Path Planning in Emergency Using Non-uniform Safety Fields.....	93
Bangrui Liu, Aimin Hao	
A Proof-Of-Concept Study on the Impact of Artificial Hypergravity on Force-Adapted Target Sizing for Direct Augmented Reality Pointing.....	95
Daniela Markov-Vetter, Vanja Zander, Joachim Latsch, Oliver Stadt	
Decoupled Mapping and Localization for Augmented Reality on a Mobile Phone.....	97
Pierre Martin, Eric Marchand, Pascal Houlier, Isabelle Marchal	
Baseline SPAAM Calibration Accuracy and Precision in the Absence of Human Postural Sway Error	99
Kenneth R. Moser, Magnus Axholt, J. Edward Swan II	
A Comparison of Four Different Approaches to Reducing Unintended Positional Drift During Walking-In-Place Locomotion	101
Niels Christian Nilsson, Stefania Serafin, Rolf Nordahl	

Reflectance and Light Source Estimation for Indoor AR Applications.....	103
Alexander Plopski, Tomohiro Mashita, Kiyoshi Kiyokawa, Haruo Takemura	
Virtual Speech Anxiety Training - Effects of Simulation Fidelity on User Experience	105
Sandra Poeschl, Nicola Doering	
Assessing Exertions: How an increased level of immersion unwittingly leads to more natural behavior	107
Kevin Ponto, Karen Chen, Ross Tredinnick, Robert G. Radwin	
Design and Evaluation of Visual Feedback for Virtual Grasp.....	109
Mores Prachyabrued, Christoph W. Borst	
Social Presence in Mixed Agency Interactions	111
Andrew Robb, Benjamin Lok	
An AR Edutainment System Supporting Bone Anatomy Learning.....	113
Philipp Stefan, Patrick Wucherer, Yuji Oyamada, Meng Ma, Alexander Schoch, Motoko Kanegae, Naoki Shimizu, Tatsuya Kodera, Sebastien Callier, Matthias Weigl, Maki Sugimoto, Pascal Fallavollita, Hideo Saito, Nassir Navab	
MuVR: A Multi-user Virtual Reality Platform	115
Jerald Thomas, Raghav Bashyal, Samantha Goldstein, Evan Suma	
CAVE Visualization of the IceCube Neutrino Detector	117
Ross Tredinnick, James Vanderheiden, Clayton Suplinski, James Madsen	
Responsive Audiences - Nonverbal Cues as Reactions to a Speaker's Behavior	119
Ana-Despina Tudor, Ilinca Mustatea, Sandra Poeschl, Nicola Doering	
VR Central Venous Access Simulation System for Newborns.....	121
Lizeth Vega-Medina, Byron Perez-Gutierrez, Gerardo Tibamoso, Alvaro Uribe-Quevedo, Norman Jaimes	
Modeling Interactions in Continuum Traffic.....	123
Hua Wang, Tianlu Mao, Zhaoqi Wang	
Comparative Study of Input Devices for a VR Mine Simulation	125
David Zielinski, Brendan Macdonald, Regis Kopper	

Doctoral Consortium

C-OLiVE: Group Co-located Interaction in VEs for Contextual Learning	129
Panagiotis Apostolellis (Virginia Polytechnic Institute and State University, USA)	
Development of a Scenario Builder Tool for Scaffolded Virtual Patients.....	131
Lauren Cairco Dukes (Clemson University, USA)	
A Framework for the Automatic 3D City Modeling using the Panoramic Image from Mobile Mapping System and Digital Maps.....	133
Hyunki Kim (KAIST, Republic of Korea)	
Simulating Crowd Interactions in Virtual Environments	135
Sujeong Kim (University of North Carolina at Chapel Hill, USA)	
Quantification of Error from System and Environmental Sources in Optical See-Through Head Mounted Display Calibration Methods.....	137
Kenneth R. Moser (Mississippi State University, USA)	
Simulating Cooperative Fire Evacuation Training in a Virtual Environment Using Gaming Technology	139
Mingze Xi (The University of Newcastle Australia, Australia)	

Videos

LunAR Park: Augmented Reality, Retro-futurism & a Ride to the Moon	143
Alexander Betts, Brenda A López Silva, Panos Oikonomou	

CORVETTE: Collaborative Environment for Technical Training and Experiment	145
Rozenn Bouville Berthelot, Thomas Lopez, Florian Nouviale, Valérie Gouranton, Bruno Arnaldi	
Control of Robot Using a Brain Computer Interface.....	147
Pramod Chembrammal, Naveen Kumar Sankaran, Thenkurussi Kesavadas	
The Effect of an Occluder on Near Field Depth Matching in Optical See-Through Augmented Reality	149
Chunya Hua, Kenneth Moser, J. Edward Swan II	
Panoramic Navigator. A Vision Machine for Expanded Spaces of Representation.	151
Volker Kuchelmeister	
CAVE2 Documentary.....	153
Jason Leigh, Andrew Johnson, Luc Renambot, Lance Long, Dan Sandin, Jonas Talandis, Alessandro Febretti, Arthur Nishimoto	
Particle Dreams in Spherical Harmonics	155
Dan Sandin, Robert Kooima, Laurie Spiegel, Tom DeFanti	
Full Body Interaction in Virtual Reality with Affordable Hardware	157
Tuukka M. Takala, Mikael Matveinen	

Research Demos

Demo 1: VR-HYPERSPACE, The Innovative Use of Virtual Reality to Increase Comfort by Changing the Perception of Self and Space.....	161
Mirabelle D’Cruz, Harshada Patel, Laura Lewis, Sue Cobb, Matthias Bues, Oliver Stefani, Tredeaux Grobler, Kaj Helin, Juhani Viitaniemi, Susanna Aromaa, Bernd Froelich, Stephan Beck, André Kunert, Alexander Kulik, Ioannis Karaseitanidis Panagiotis Psonis, Nikos Frangakis, Mel Slater, Ilias Bergstrom, Elena Kokkinara, Betty Mohler, Markus Leyrer, Florian Soyka, Enrico Gaia, Domenico Tedone, Michael Olbert, Mario Cappitelli	
Demo 2: Product Accessibility Evaluation using Virtual User Models	163
Panagiotis Moschonas, Athanasios Tsakiris, Dimitrios Tzouvaras	
Demo 3: Geometrically-correct projection-based texture mapping onto a cloth	165
Yuichiro Fujimoto, Takafumi Taketomi, Goshiro Yamamoto, Jun Miyazaki, Hirokazu Kato, Ross T. Smith, Bruce H. Thomas	
Demo 4: Application of Hanger Reflex to wrist and waist	167
Takuto Nakamura, Narihiro Nishimura, Michi Sato, Hiroyuki Kajimoto	
Demo 5: An Ungrounded Tactile Feedback Device to Portray Force and Torque- Like Interactions in Virtual Environments	169
Ashley L. Guinan, Markus N. Montandon, Andrew J. Doxon, and William R. Provancher	
Demo 6	
Demo 7: A Demonstration of Tablet-Based Interaction Panels for Immersive Environments	173
David M. Krum, Thai Phan, Lauren Cairco Dukes, Peter Wang, Mark Bolas	
Demo 8: The Virtual World Framework: Collaborative Virtual Environments on the Web	175
Eric Burns, David Easter, Rob Chadwick, David A. Smith, Carl Rosengrant	
Demo 9: Diplopia: A Virtual Reality Game Designed To Help Amblyopics.....	177
James Blaha, Manish Gupta	
Demo 10: AR Jigsaw Puzzle with RGB-D Based Detection of Texture-Less Pieces	179
João Paulo Lima, João Marcelo Teixeira, Veronica Teichrieb	
Demo 11: Ubiquitous Virtual Reality ‘To-Go’	181
Aryabrata Basu, Kyle Johnsen	
Demo 12: Automatic Acquisition and Animation of Virtual Avatars.....	183
Ari Shapiro, Andrew Feng, Ruizhe Wang, Gerard Medioni, Mark Bolas, Evan A. Suma	

Panels

Panel 1: The Battle for Head-Mounted Displays

Jason Jerald (moderator) (NextGen Interactions, USA), Stephen R. Ellis (NASA Ames Research Center, USA), Yuval Boger (Sensics, USA), David A. Smith (Lockheed Martin, USA)

Panel 2: Virtual Reality: Improving Passenger Comfort in Future Flights

Mirabelle D’Cruz (moderator) (The University of Nottingham, UK), Harshada Patel (The University of Nottingham, UK), Elena Kokkinara (University of Barcelona EVENT Lab, Spain), Betty Mohler (Max Planck Institute for Biological Cybernetics, Germany), Matthias Bues (Fraunhofer Institute IAO, Germany), Giannis Karaseitanidis (Institute of Communication and Computer Systems, Greece), Bernd Froehlich (Bauhaus-Universität Weimar, Germany), Domenico Tedone (Thales Alenia Space Italia S.p.A., Italy)

Panel 3: VR Toolkits: Why do we keep reinventing the wheel?

Daniel Acevedo-Feliz (moderator) (King Abdullah University of Science and Technology, Saudi Arabia), Bret Jackson (University of Minnesota, USA), Daniel Keefe (University of Minnesota, USA), Ryan Pavlik (Iowa State University, USA), Jurgen Schulze (University of California San Diego, USA), William Sherman (Indiana University, USA), Alexis Vartanian (TechViz, France)

Workshops

Workshop 1: Workshop on Sonic Interactions in Virtual Environments

Organizers: Stefania Serafin, Amalia de Götzen, Cumhuri Erkut, Rolf Nordahl

Workshop 2: Workshop on Immersive Volumetric Interaction

Organizers: Amy Banic, Patrick O’Leary, Bireswar Laha

Workshop 3: Software Engineering and Architectures for Realtime Interactive Systems Working Group

Organizers: Marc Erich Latoschik, Dirk Reiners, Roland Blach, Pablo Figueroa

Workshop 4: International Workshop on Collaborative Virtual Environments

Organizer: Thierry Duval

Workshop 5: International Workshop on Virtual and Augmented Assistive Technology

Organizers: John Quarles, Belinda Lange, Andrew Raij

Tutorials

Tutorial 1: Developing Virtual Reality Applications with Unity

Speakers: Jason Jerald (NextGen Interactions), Peter Giokaris (Oculus VR), Danny Woodall (Sixsense Entertainment), Arno Hartbolt (University of Southern California Institute for Creative Technologies), Anish Chandak (Impulsonic), Sébastien Kuntz (i’m in VR)

Tutorial 2: Quantitative and Qualitative Methods for Human-Subject Experimental Game Design with the Oculus Rift

Speakers: J. Edward Swan II (Organizer) (Mississippi State University), Joseph L. Gabbard, Jr. (Virginia Tech)

Tutorial 3: Experiments in Virtual and Augmented Reality

Speakers: Tushar Arora (Entertainment Technology Center of Carnegie Mellon University), Frank Hamilton (Entertainment Technology Center of Carnegie Mellon University)