IEEE Virtual Reality 2007

IEEE Symposium on 3D User Interfaces 2007

VR 2007

March 10-14, 2007   Charlotte, North Carolina USA

IEEE

IEEE COMPUTER SOCIETY

IEEE vgtc

VR TUTORIALS, WORKSHOPS & 3DUI SYMPOSIUM AT-A-GLANCE

SATURDAY

Time				3DUI — Charlotte Hall
8:30	Tutorial 1: Virtual Reality Technology - An Introduction	Tutorial 2: Conducting Human Subject Experiments with Virtual and Augmented Reality	Workshop 1: The Future Standards for Immersive VR	Intro
9:00				3D Movement
9:30				
10:00				Break
10:30				Sequences & Gestures
11:00				
11:30				
12:00				
12:30				Lunch Break
1:00				
1:30		Tutorial 3: Integration of Haptics in Virtual Environments - A Perception-Based Approach		Devices
2:00				
2:30				
3:00				Poster Mania & Poster Presentation Break
3:30				
4:00				Mixed & Augmented Reality
4:30				
5:00				

Mecklenburg Hall — Exhibits

SUNDAY (clocks move forward one hour @ 2am)

Time				3DUI — Charlotte Hall
8:30	Tutorial 4a: Navigation - Theoretical Foundations and Techniques for Travel	Tutorial 5: Handheld Augmented Reality	Workshop 2: Mixed Reality User Interfaces: Specification, Authoring, Adaptation	Keynote Address
9:00				
9:30				
10:00				Break
10:30				3D Selection
11:00				
11:30				
12:00				
12:30				Lunch Break
1:00				
1:30	Tutorial 4b: Navigation - Aiding and Evaluating Navigation		Workshop 3: Trends and Issues in Tracking for Virtual Environments	Forces
2:00				
2:30				
3:00				Break
3:30				
4:00				3D Navigation & Entertainment
4:30				
5:00				Closing

Mecklenburg Hall — Exhibits

6:00 – 8:00 — Welcome Reception — *Piedmont Crescent Promenade*

* Please visit registration table for Tutorial & Workshop room assignments.

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MONDAY

Time		
8:30	Opening Remarks — *Charlotte Hall*	
9:00 – 9:30	Papers 1: Perception & Human Factors — *Charlotte Hall*	
10:00	Break	
10:30 – 11:00	Keynote Address: VR - Past, Present and Future — *Charlotte Hall*	
11:30	Poster & Research Demo Fast Forward — *Charlotte Hall*	
12:00 – 1:30	Lunch Break	
2:00 – 2:30	Sketches 2: VR Systems & Applications — *Charlotte Hall*	Sketches 1: Modeling, Rendering & Virtual Humans — *Carolina Hall*
3:00	Break	
3:30 – 4:30	Papers 2: 3DUI & VR/AR Systems — *Charlotte Hall*	Panel 1: VR Support of Clinical Applications — *Carolina Hall*
6:00 – 8:00	UNC Charlotte Lab Tour & Reception	

Mecklenburg Hall — Exhibits · Mecklenburg Hall — Research Demos

TUESDAY

Time		
8:30	Papers 3: Scene Complexity Mgmt — *Charlotte Hall*	Panel 2: Student Panel: Building the Future of and a Career in VR — *Carolina Hall*
9:30 – 10:00	Papers 4: Tracking — *Charlotte Hall*	
10:30	Break	
11:00 – 11:30	Papers 5: Modeling & Simulation — *Charlotte Hall*	Sketches 3: Augmented & Mixed Reality — *Carolina Hall*
12:00 – 1:30	Lunch Break	
2:00 – 3:00	Papers 6: Distributed and Networked VR — *Charlotte Hall*	
3:30	Break	
4:00 – 4:30	Panel 3: Spatial Perception in Immersive Virtual Environments: New Theories and Current Controversies — *Charlotte Hall*	
5:00	Posters — *Piedmont Crescent Promenade*	
7:00 – 8:00	Dinner Banquet — *Charlotte Hall*	

Mecklenburg Hall — Exhibits · Mecklenburg Hall — Research Demos

WEDNESDAY

Time	
8:30 – 9:30	Papers 7: Display — *Charlotte Hall*
10:00	Break
10:30 – 11:30	Papers 8: Multi-Sensory Interaction — *Charlotte Hall*
12:00 – 1:30	Lunch Break
2:00 – 3:00	Papers 9: Modeling & Rendering — *Charlotte Hall*
3:30	Break
4:00 – 4:30	Awards and Closing — *Charlotte Hall*

Mecklenburg Hall — Exhibits · Mecklenburg Hall — Research Demos

HILTON CHARLOTTE CENTER CITY

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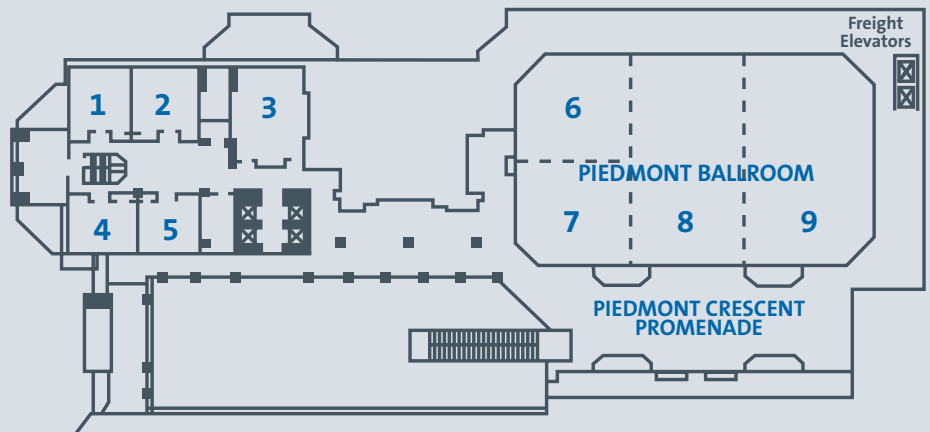
THIRD FLOOR

1 DUNN	6 NORTH CAROLINA HALL
2 GRAHAM	7 SOUTH CAROLINA HALL
3 GRAVES	8 CHARLOTTE HALL
4 CALDWELL	9 MECKLENBURG HALL
5 ARDREY	

SATURDAY MARCH 10
VR CONFERENCE

8:30 am - 5:00 pm

☐ **Tutorial 1: Virtual Reality Technology - An Introduction**
Presenter: Grigore Burdea, *Rutgers University*

☐ **Tutorial 2: Conducting Human Subject Experiments with Virtual and Augmented Reality**
Presenters: Ed Swan, *Mississippi State University,* Steve Ellis, *NASA Ames,* Dov Adelstein, *NASA Ames*

☐ **Workshop 1: The Future Standards for Immersive VR**
Organizers: Nicholas F. Polys, *Virginia Tech,* Don Brutzman, *Naval Postgraduate School,* Anthony Steed, *University College London,* Johannes Behr, *Fraunhofer IGD*

1:30 pm - 5:00 pm

☐ **Tutorial 3: Integration of Haptics in Virtual Environments - A Perception-Based Approach**
Presenters: Anatole Lécuyer, *IRISA,* Matthias Harders, *ETH Zurich,* Lynette A. Jones, *MIT,* Günter Niemeyer, *Stanford University,* Miguel A. Otaduy, *ETH Zurich,* Dinesh K. Pai, *Rutgers University*

3DUI SYMPOSIUM

8:30 am - 8:45 am

Charlotte Hall

☐ **Introduction**

8:45 am - 10:00 am

Charlotte Hall

☐ **3D Movement**
Visual Appearance of User's Avatar Can Influence the 3D Manipulation of Both Real Devices and Virtual Objects, Abdelmajid Kadri, Anatole Lécuyer, Jean-Marie Burkhardt, Simon Richir

An Exploration of Interaction-Display Offset on User Performance in Surround Screen Virtual Environments, Joseph LaViola, Dmitri Lemmerman

Exploring 3D Interaction in Alternate Control-Display Space Mappings, Jeroen Keijser, Sheelagh Carpendale, Mark Hancock, Tobias Isenberg

10:00 am - 10:45 am

☐ **Break**

10:45 am - 12:00 pm

Charlotte Hall

☐ **Sequences & Gestures**
An Empirical Comparison of Task Sequences for Immersive Virtual Environments, Ryan P. McMahan, Doug A. Bowman

Design and Development of a Pose-Based Command Language for Triage Training in Virtual Reality, Andrei Sherstyuk, Dale Vincent, Jack Lui, Kathleen Connolly, Kin Lik Wang, Stanley Saiki, Thomas Caudell

Optical Sight Metaphor for Virtual Environments (Technote), Andrei Sherstyuk, Jarrell Pair, Anton Treskunov

AutoEval mkII - Interaction Design for a VR Design Review System (Technote), Martin Naef, John Payne

12:00 pm - 1:30 pm

☐ **Lunch Break**

1:30 pm - 2:45 pm

Charlotte Hall

☐ **Devices**
An Exploration of Non-Isomorphic 3D Rotation in Surround Screen Virtual Environments, Joseph LaViola, Michael Katzourin

Cross-section Projector: Interactive and Intuitive Presentation of 3D Volume Data using a Handheld Screen, Koichi Hirota, Yuya Saeki

A Family of New Ergonomic Harness Mechanisms for Full-Body Natural Constrained Motions in Virtual Environments, Roger Kaufman

2:45 pm - 3:00 pm

Charlotte Hall

☐ **Poster Mania**

3:00 pm - 4:00 pm

Piedmont Crescent Promenade

☐ **Poster Presentation Break**
A Model for 3D User Interfaces Based on Interaction Tasks, Irma Lindt

Withindows: A Single-Authoring Framework for Desktop and Immersive Interfaces, Alex Hill, Andrew Johnson

The Characteristics of Distance Perception of Depth Using Stereo Camera, Yuki Terata, Kazuki Saruta, Kazutoki Takeda

Control of Navigable Panoramic Imagery with Information Furniture: Chair-Driven 2.5d Steering Through Multi-perspective QTVR Panoramas, Kunihiro Doi, Michael Cohen

An Evaluation of 3D Positioning Techniques for Scene Assembly, Robert J. Teather, Wolfgang Stuerzlinger

A String-Actuated Exoskeleton for Human-Scale Interactions in a 3D Virtual Environment, Rasul Fesharakifard, Maryam Khalili, Philippe Fuchs

Interactive Social Displays, Thies Pfeiffer, Marc Erich Latoschik

Towards Better Interactions with a 3D Deformable Model with Your Hands, Diane Lingrand, S. Meunier, Ph. Renevier, A.-M. Pinna-Déry, M. Riveill, J. Soula

Enhancement of a Partial Height Field Using Haptic Rendering, Yutaka Maruoka, Yasuhiko Watanabe, Yoshihiro Okada

Interacting with Projected Displays by Means of a 3D Interface and an Instrumented Bracelet, Lübomira Spassova

Haptic Interfaces for Virtual Shape Exploration in Industrial Design, Monica Bordegoni, Umberto Cugini

4:00 pm - 5:30 pm

Charlotte Hall

☐ **Mixed & Augmented Reality**
Cascading Hand and Eye Movement for Augmented Reality Videoconferencing, István Barakonyi, Helmut Prendinger, Dieter Schmalstieg, Mitsuru Ishizuka

Balloon Selection: A Multi-Finger Technique for Accurate Low-Fatigue 3D Selections, Hrvoje Benko, Steven Feiner

Usability of Hybrid, Physical and Virtual Objects for Basic Manipulation Tasks in Virtual Environments, Frank-Lothar Krause, Israel Johann Habakuk, Jens Neumann, Tobias Feldmann-Wüstefeld

Character Interaction System with Autostereoscopic Display (Technote), Miho Kobayashi, Michio Oikawa, Takafumi Koike, Kei Utsugi, Masami Yamasaki, Satoshi Kitagawa

SUNDAY MARCH 11
DAYLIGHT SAVINGS TIME! Clocks spring forward on Sunday @ 2 a.m.

VR CONFERENCE

8:30 am - 12:00 pm

☐ **Tutorial 4a: Navigation - Theoretical Foundations and Techniques for Travel**
Presenter: Roy Ruddle, *University of Leeds*

8:30 am - 5:00 pm

☐ **Tutorial 5: Handheld Augmented Reality**
Presenters: Daniel Wagner, *TU Graz,* Blair MacIntyre, *Georgia Tech,* Mark Billinghurst, *HITLab New Zealand,* István Barakonyi, *TU Graz*

☐ **Workshop 2: Mixed Reality User Interfaces: Specification, Authoring, Adaptation**
Organizers: Raimund Dachselt, *TU Dresden, Multimedia Technology Group,* Pablo Figueroa, *Universidad de los Andes Bogota,* Irma Lindt, *Fraunhofer FIT Sankt Augustin,* Wolfgang Broll, *Fraunhofer FIT Sankt Augustin*

1:30 pm - 5:00 pm

☐ **Tutorial 4b: Navigation - Aiding and Evaluating Navigation**
Presenter: Roy Ruddle, *University of Leeds*

☐ **Workshop 3: Trends and Issues in Tracking for Virtual Environments**
Organizer: Gabriel Zachmann, *Clausthal University*

6:00 pm - 8:00 pm
Piedmont Crescent Promenade

☐ **Welcome Reception**

3DUI SYMPOSIUM

8:45 am - 10:00 am
Charlotte Hall

☐ **Keynote Address,** Rob Jacob, *Tufts University*

10:00 am - 10:45 am

☐ **Break**

10:45 am - 12:00 pm
Charlotte Hall

☐ **3D Selection**
Virtual Pads: Decoupling Motor Space and Visual Space for Improved Manipulation of 2D Windows Within VEs, Carlos Andujar, Ferran Argelaguet

Two Handed Selection Techniques for Volumetric Data, Amy Ulinski, Catherine Zanbaka, Zachary Wartell, Paula Goolkasian, Larry Hodges

Exploring the Effects of Environment Density and Target Visibility on Object Selection in 3D Virtual Environments, Lode Vanacken, Tovi Grossman, Karin Coninx

12:00 pm - 1:30 pm

☐ **Lunch Break**

1:30 pm - 3:00 pm
Charlotte Hall

☐ **Forces**
Tactile Feedback at the Finger Tips for Improved Direct Interaction in Immersive Environments, Robert Scheibe, Mathias Moehring, Bernd Froehlich

Real-time Interactions and Synchronization of Voxel-based Collaborative Virtual Environments, Eric Acosta, Alan Liu

Immersive Flight for Surveillance Applications (Technote), Xavier Righetti, Sylvain Cardin, Daniel Thalmann, Frederic Vexo

"Tokens and Board" User Interface from Force-Torque Sensing Technique (Technote), Bundit Panchaphongsaphak, Robert Riener

3:00 pm - 3:45 pm

☐ **Break**

3:45 pm - 5:00 pm
Charlotte Hall

☐ **3D Navigation & Entertainment**
Comparison of Travel Techniques in a Complex, Multi-Level 3D Environment, Evan Suma, Sabarish Babu, Larry Hodges

An Avatar-Based Approach to 3D User Interface Design for Children, Tian Wang, Xizhi Li, Jiaoying Shi

Pointman - A Device-Based Control for Realistic Tactical Movement (Technote), James Templeman, Linda Sibert, Robert Page, Patricia Denbrook

Seven League Boots: An New Metaphor for Augmented Locomotion through Large Scale Immersive Virtual Environments (Technote), Victoria Interrante, Brian Ries, Lee Anderson

5:00 pm - 5:15 pm
Charlotte Hall

☐ **Awards and Closing Remarks**

MONDAY MARCH 12
VR CONFERENCE

8:30 am - 9:00 am
Charlotte Hall

☐ **Opening Remarks**

9:00 am - 10:30 am
Charlotte Hall

☐ **Papers 1: Perception & Human Factors**
Chair: Mary Whitton, *University of North Carolina, Chapel Hill*

Can People Not Tell Left from Right in VR? Point-to-Origin Studies Revealed Qualitative Errors in Visual Path Integration, Bernhard E. Riecke, Jan M. Wiener

Elucidating the Factors that can Facilitate Veridical Spatial Perception in Immersive Virtual Environments, Victoria Interrante, Brian Ries, Jason Lindquist, Lee Anderson

Calibration-free Recognition of Grasp Types - A Comparison of Classification Methods, Guido Heumer, Heni Ben Amor, Matthias Weber, Bernhard Jung

10:30 am - 11:00 am

☐ **Break**

11:00 am - 12:00 pm
Charlotte Hall

☐ **Keynote Address: VR - Past, Present and Future**
Jim Foley, *School of Interactive Computing, College of Computing, Georgia Institute of Technology, Atlanta, GA*

VR has come a long way - from clunky, mechanically-tracked HMDs driven by multi-million dollar computers - to sleek wireless HMDs driven by commodity PCs and graphics cards - and many purported VR applications don't use HMDs at all. Applications have expanded from scientific, engineering and military to entertainment and social networking. The meaning of VR has changed. In this talk I ask (and endeavor to answer) questions such as: "What is the essence of VR?" "What is the future of VR?" "How has VR changed?" "What is the science behind VR?" "What are open VR research questions?"

12:00 pm - 12:30 pm

Charlotte Hall

☐ **Poster and Research Demo Fast Forward**
Chair: Anthony Steed, *University College London*

12:30 pm - 2:00 pm

☐ **Lunch Break**

2:00 pm - 3:30 pm

Carolina Hall

☐ **Sketches 1: Modeling, Rendering & Virtual Humans**
Chair: Benjamin Lok, *University of Florida*

Reactive Virtual Human with Bottom-up and Top-down Visual Attention, Hironori Mitake, Shoichi Hasegawa, and Makoto Sato

Can Immersive Virtual Humans Teach Social Conversational Protocols? Sabarish Babu, Evan Suma, Tiffany Barnes, Larry Hodges

Mobile Scouting for On-line 3D Reconstruction, Bernhard Reitinger, Christopher Zach, Dieter Schmalstieg

Rapid Animation of Laser-scanned Humans, Edilson de Aguiar, Christian Theobalt, Carsten Stoll, Hans-Peter Seidel

Analyzing Urban Daylighting Ambiences by Walking in a Virtual City, Souha Tahrani, Guillaume Moreau

Charlotte Hall

☐ **Sketches 2: VR Systems & Applications**
Chair: Yoshifumi Kitamura, *Osaka University*

The IllusionHole for Medical Applications, Yoshifumi Kitamura, Takashi Nakashima, Keisuke Tanaka, Takeshi Johkoh

Muddleware for Prototyping Mixed Reality Multiuser Games, Daniel Wagner, Dieter Schmalstieg

Flexible Abstraction Layers for VR Application Development, Gerwin de Haan, Michal Koutek, Frits Post

VRFire: An Immersive Visualization Experience for Wildfire Spread Analysis, William Sherman, Michael Penick, Fredrick Harris, Simon Su, Tim Brown

Real-time Volumetric Haptic and Visual Burrhole Simulation, Eric Acosta, Alan Liu, Rocco Armonda, Mike Fiorill, Randy Haluck, Carol Lake, Gilbert Muniz, Mark Bowyer

3:30 pm - 4:00 pm

☐ **Break**

4:00 pm - 5:30 pm

Charlotte Hall

☐ **Papers 2: 3DUI & VR/AR Systems**
Chair: J. Edward Swan II, *Mississippi State University*

Interscopic User Interface Concepts for Fish Tank Virtual Reality Systems, Frank Steinicke, Timo Ropinski, Gerd Bruder, Klaus Hinrichs

Active Text Drawing Styles for Outdoor Augmented Reality: A User-Based Study and Design Implications, Joseph L. Gabbard, J. Edward Swan II, Deborah Hix, Si-Jung Kim, Greg Fitch

Laparoscopic Virtual Mirror - New Interaction Paradigm for Monitor Based Augmented Reality, Nassir Navab, Marco Feuerstein, Christoph Bichlmeier

Carolina Hall

☐ **Panel 1: VR Support of Clinical Applications: Collaboration, Politics, & Ethics**
Organizer: Benjamin Lok, *University of Florida*
Panelists: Henry Fuchs, *University of North Carolina,* Grigore Burdea, *Rutgers University,* Zohara Cohen, *NIH/NIBIB,* Rick Satava, *University of Washington*

6:00 pm - 9:00 pm

☐ **UNC Charlotte Lab Tour & Reception**

8:30 am - 9:30 am

Charlotte Hall

☐ **Papers 3: Scene Complexity Management**
Chair: Dirk Reiners, *University of Louisiana at Lafayette*

Taxonomy of 3D Occlusion Management Techniques, Niklas Elmqvist, Philippas Tsigas

The Effects of Scene Complexity, Stereovision, and Motion Parallax on Size Constancy in a Virtual Environment, Xun Luo, Robert Kenyon, Derek Kamper, Daniel Sandin, Thomas DeFanti

8:30 am - 10:30 am

Carolina Hall

☐ **Panel 2: Student Panel: Building the Future of and a Career in VR (sponsored by NSF)**
Organizer: Benjamin Lok, *University of Florida*
Panelists: Kyle Johnsen, *University of Florida,* Catherine Zanbaka, *University of North Carolina at Charlotte,* Daniel Acevedo, *Brown University,* Sharif Razzaque, *InnerOptic Technology,* Nicholas Polys, *Virginia Tech*

9:30 am - 10:30 am

Charlotte Hall

☐ **Papers 4: Tracking**
Chair: Simon Julier, *University College London*

Indoor Vision-Based Localization Using Coded Seamless Pattern for Interior Decoration, Shigeru Saito, Atsushi Hiyama, Tomohiro Tanikawa, Michitaka Hirose

GroundCam: A Tracking Modality for Mobile Mixed Reality, Stephen DiVerdi, Tobias Höllerer

10:30 am - 11:00 am

☐ **Break**

11:00 am - 12:30 pm

Charlotte Hall

☐ **Papers 5: Modeling & Simulation**
Chair: Sabine Coquillart, *INRIA*

Balanced Hierarchies for Collision Detection between Fracturing Objects, Miguel A. Otaduy, Olivier Chassot, Denis Steinemann, Markus Gross

Real-time Path Planning for Virtual Agents in Dynamic Environments, Avneesh Sud, Erik Andersen, Sean Curtis, Ming Lin, Dinesh Manocha

Pose Synthesis Using Inverse Jacobian Matrices Learned from Examples, Chunpeng Li, Shihong Xia, Zhaoqi Wang

Carolina Hall

☐ **Sketches 3: Augmented & Mixed Reality**
Chair: Tobias Höllerer, *University of California, Santa Barbara*

Magic Mirror System with Hand-held and Wearable Augmentations, Mark Fiala

Single View Camera Calibration for Augmented Virtual Environments, Lu Wang, Suya You, Ulrich Neumann

A Nested Marker for Augmented Reality, Keisuke Tateno, Itaru Kitahara, Yuichi Ohta

Joystick mapped Augmented Reality Cues for End-Effector Controlled Tele-operated Robots, Aditya Nawab, Keshav Chintamani, Darin Ellis, Gregory Auner, Abhilash Pandya

MARA - A Mobile Augmented Reality-Based Virtual Assistant, Andreas Schmeil, Wolfgang Broll

12:30 pm - 2:00 pm

☐ Lunch Break

2:00 pm - 3:30 pm

Charlotte Hall

☐ **Papers 6: Distributed and Networked VR**
Chair: Heedong Ko, *Korea Institute of Science and Technology*

On the Characterization of Peer-To-Peer Distributed Virtual Environments, Silvia Rueda, Pedro Morillo, Juan Manuel Orduña, José Duato

Effective Cooperative Haptic Interaction over the Internet, Mashhuda Glencross, Caroline Jay, Jeff Feasel, Luv Kohli, Mary Whitton, Roger Hubbold

Variability-Aware Latency Amelioration in Distributed Environments, Oleksiy Tumanov, Robert Allison, Wolfgang Stuerzlinger

3:30 pm - 4:00 pm

☐ **Break**

4:00 pm - 5:30 pm

Charlotte Hall

☐ **Panel 3: Spatial Perception in Immersive Virtual Environments: New Theories and Current Controversies**
Organizer: Victoria Interrante, *University of Minnesota*

Panelists: Dennis Proffitt, *University of Virginia,* William Thompson, *University of Utah,* Edward Swan, *Mississippi State University,* Joe Kearney, *University of Iowa*

5:30 pm -7:00 pm

Piedmont Crescent Promenade

☐ **Posters**

Parallel Adaptive Octree Carving for Real-time 3D Modeling, Luciano Soares, Clément Ménier, Bruno Raffin, Jean-Louis Roch

Stepping over Virtual Obstacles with an Actuated Gait Orthosis, Mathias Wellner, Joachim von Zitzewitz, Alexander Duschau-Wicke, Robert Riener

Registered, Sensor-Integrated Virtual Reality for Surgical Applications, Brady King, Luke Reisner, Michael Klein, Gregory Auner, Abhilash Pandya

Development of an Integrated Multi-Axis Tactile Sensor: Distributed Preprocessing for Tactile Recognitions, Shunsuke Yoshida, Terukazu Mizota, Haruo Noma

Automatic Selective Disassembly and Path Planning for the Simulation of Maintenance Operations, Iker Aguinaga, Diego Borro, Luis Matey

Pointman – A New Control for Simulating Tactical Infantry Movements, James Templeman, Linda Sibert, Robert Page, Patricia Denbrook

Rapid Acquisition of Persistent Object Textures, Mathias Kolsch

VR-based Paint Spray Training Simulator, Ungyeon Yang, Gun A. Lee, Seonhyung Shin, Sunyu Hwang, Wookho Son

Visual Appearance of User's Avatar Can Influence the Manipulation of Both Virtual Objects and Real Devices, Abdelmajid Kadri, Anatole Lécuyer, Jean-Marie Burkhardt, Simon Richir

Tactile Feedback at the Finger Tips for Improved Direct Interaction in Immersive Environments, Robert Scheibe, Mathias Moehring, Bernd Froehlich

MACBETH: The Avatar Which I See Before Me and Its Movement Toward my Hand, Eric Burns, Sharif Razzaque, Mary Whitton, Frederick Brooks

Time Delay Measurement and Lag Compensation with Reflex HMD, Ryugo Kijima, Kazuyoshi Kitabayashi, Yuichiro Hayakawa

Sensor Enhanced Virtual Reality Teleoperation in Dynamic Environment, Muthukkumar Kadavasal, James Oliver

VR Aided Motor Training for Post-Stroke Rehabilitation: System Design, Methodology for Evaluation, Clinical Test & Visualization Tools, Shih-Ching Yeh, Jill Stewart, Margaret McLaughlin, Carolee Winstein, Thomas Parsons, Albert Rizzo

Managing User Privacy and Cooperation Demand in a Collaborative Molecule Modeling Virtual System, Wenjun Ma, Ying Zhu

Effects of Interaction-Display Offset on User Performance in Surround Screen Virtual Environments, Joseph LaViola, Dmitri Lemmerman

Towards Intelligent VR: Multi-Layered Semantic Reflection for Intelligent Virtual Environments, Marc Erich Latoschik, Christian Fröhlich, Alexander Wendler, Peter Biermann

Visualizing Spray Paint Deposition in VR Training, Daeseok Kim, Youngwoo Yoon, Sunyu Hwang, Geehyuk Lee, Jinah Park

Harness Mechanisms for Full-Body Motions in Virtual Environments, Roger E. Kaufman

7:30 pm - 10:00 pm

Charlotte Hall

☐ **Dinner Banquet**

WEDNESDAY MARCH 14
VR CONFERENCE

8:30 am - 10:30 am

Charlotte Hall

☐ **Papers 7: Display**
Chair: Oliver Staadt, *University of California, Davis*

A GPU Sub-pixel Algorithm for Autostereoscopic Virtual Reality, Robert L Kooima, Tom Peterka, Javier I Girado, Jinghua Ge, Daniel J Sandin, Thomas A DeFanti

Non-Uniform Crosstalk Reduction for Dynamic Scenes, Ferdi Smit, Robert van Liere, Bernd Froehlich

A Personal Surround Environment: Projective Display with Correction for Display Surface Geometry and Extreme Lens Distortion, Tyler Johnson, Florian Gyarfas, Rick Skarbez, Herman Towles, Henry Fuchs

Dynallax: Solid State Dynamic Parallax Barrier Autostereoscopic VR Display, Tom Peterka, Robert L. Kooima, Javier I. Girado, Jinghua Ge, Daniel J. Sandin, Andrew Johnson, Jason Leigh, Jurgen Schulze, Thomas A. DeFanti

10:30 am - 11:00 am

☐ **Break**

11:00 am - 12:30 pm

Charlotte Hall

☐ **Papers 8: Multi-Sensory Interaction**
Chair: Bernd Froehlich, *Bauhaus University Weimar*

Collision Awareness using Vibrotactile Arrays, Aaron Bloomfield, Norman Badler

Designing and Evaluating a Haptic System for Biomolecular Education, Petter Bivall Persson, Matthew D. Cooper, Lena A.E. Tibell, Shaaron Ainsworth, Anders Ynnerman, Bengt-Harald Jonsson

Improvement of Olfactory Display Using Solenoid Valves, Takamichi Nakamoto, Phan Hi Dinh Min

12:30 pm - 2:00 pm

☐ **Lunch Break**

2:00 pm - 3:30 pm	3:30 pm - 4:00 pm
Charlotte Hall	☐ **Break**
☐ **Papers 9: Modeling & Rendering**	**4:00 pm - 5:00 pm**
Chair: Enhua Wu, *University of Macau and Academia Sinica*	*Charlotte Hall*
Walking into Images: Virtual Plane Mosaics for Plenoptic Modeling, Bin Sheng, Enhua Wu	☐ **Awards and Closing**
Multi-Frame Rate Rendering and Display, Jan P. Springer, Stephan Beck, Felix Weiszig, Dirk Reiners, Bernd Froehlich	
No Distortion Shell Map Generation, Kai Ye, Kun Zhou, Zhigeng Pan	

RESEARCH DEMOS AND EXHIBITS

RESEARCH DEMOS

Monday-Tuesday 9:30 am-6:00 pm, Wednesday 9:30 am-2:00 pm

Mecklenburg Hall

Pointman: - A New Control for Simulating Tactical Infantry Movements, *Naval Research Laboratory, Denbrook Computing Services*

Affordable Infrared-Optical Pose-Tracking for Virtual and Augmented Reality, *Interactive Media Systems Group, Vienna University of Technology*

Tactile Feedback at the Finger Tips for Improved Direct Interaction in Immersive Environments, *Volkswagen AG, Group Research, Bauhaus-University Weimar*

Game of Cooking With Scents Using an Interactive Olfactory Display, *Tokyo Institute of Technology, Tokyo National University of Fine Arts and Music, Nagahama Design Office, Tokyo National University of Fine Arts and Music*

Mental Health and Rehabilitation projects at The University of Southern California Institute for Creative Technologies, *University of Southern California, Virtually Better Inc.*

"Magic Lens" Augmented Reality Demo using the ARTag System, *National Research Council of Canada*

EXHIBITS

Saturday 9:30 am - 6:00 pm, Sunday 9:30 am - 1:00 pm, Monday-Tuesday 9:30am - 6:00 pm, Wednesday 9:30 am - 2:00 pm

Mecklenburg Hall

Barco, Inc., http://www.barco.com/simulation

Intersense, Inc., http://www.intersense.com

Intuition, http://www.intuition-eunetwork.org

Mechdyne, Inc., http://www.mechdyne.com

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