MARCH 20-26 Waltham, MA, USA

IEEE VIRTUAL REALITY 10

IEEE Symposium on 3D User Interfaces
IEEE Haptics Symposium

CONFERENCE PROGRAM

IEEE VR 20 10

IEEE vgtc

IEEE

IEEE computer society

haptics technical committee

WELCOME

Welcome to the 17th incarnation of the IEEE Virtual Reality conference! As in past years, IEEE VR 2010 promises to be an exciting and inspiring week of events. We are honored again to have as "bookends" to the conference the 5th IEEE Symposium on 3D User Interfaces (3DUI) on the Saturday and Sunday before the conference, and the 18th Haptics Symposium on the Thursday and Friday following it. In addition to 3DUI, the variety of offerings on the weekend includes four in-depth Workshops and five highly instructive Tutorials.

We wish to thank the entire conference committee for handling the many aspects of the week. Without the strong volunteerism in this community, the conference could not happen. We hope attendees take the time to savor the outstanding seafood in New England, take in a whale-watching trip, visit the historical surrounds, and just get to know the real experience that is Boston.
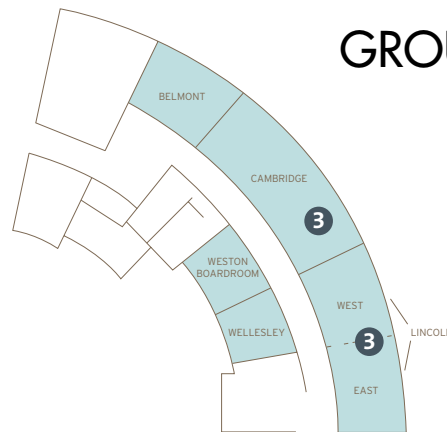
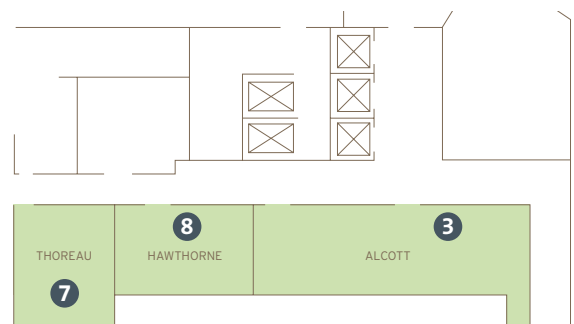*- Robert W. Lindeman & Carolina Cruz-Neira, VR 2010 General Chairs*

MAP

① VR Paper Sessions
Eden Vale Ballroom

② 3DUI Paper & Haptics Oral Sessions
Eden Vale A/B

③ VR Workshops, Tutorials and Research Demonstrations
Cambridge, Lincoln & Alcott

④ VR, 3DUI & Haptics Poster Displays
Eden Vale Foyer

⑤ VR Exhibits
Concord Ballroom

⑥ Haptics Exhibition & Demonstrations 3DUI Contest & Demonstrations
Eden Vale C & Emerson

⑦ Student Volunteer Room
Thoreau

⑧ Speaker Prep
Hawthorne
Saturday - Friday, 7:30 am - 5 pm

⑨ Breakfast
Eden Vale Foyer
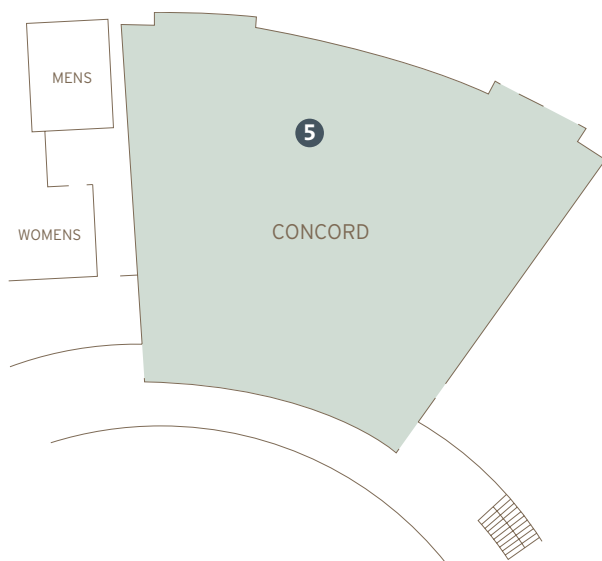*Saturday - Friday, 7:30 am - 8:30 am*
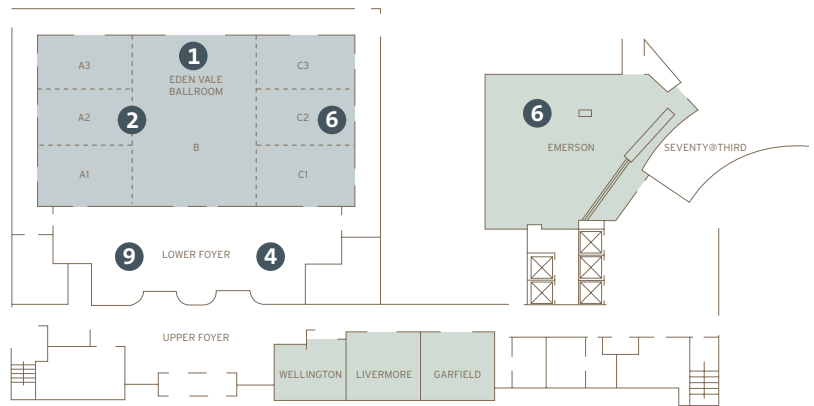
GROUND LEVEL

LOWER LEVEL

MEZZANINE LEVEL

COMMITTEE MEMBERS

VR CONFERENCE COMMITTEE

General Chairs
Robert W. Lindeman, Worcester Polytechnic Institute
Carolina Cruz-Neira, University of Louisiana at Lafayette

Program Chairs
Benjamin Lok, University of Florida
Gudrun Klinker, Technische Universität München
Ryohei Nakatsu, National University of Singapore

Poster Chairs
Hector Garcia, Old Dominion University
Torsten Kuhlen, RWTH Aachen University
J. Edward Swan II, Mississippi State University

Video Chairs
Evan Suma, University of North Carolina at Charlotte
Gabriel Zachmann, Technical University of Clausthal

Panel Chairs
Sabine Coquillart, INRIA
Mary C. Whitton, University of North Carolina at Chapel Hill
Yasuyuki Yanagida, Meijo University

Workshop Chairs
Jian Chen, Brown University
Luv Kohli, University of North Carolina at Chapel Hill
Ernst Kruijff, Graz University of Technology

Tutorial Chairs
Laura Arns, Naval Air Systems Command, Weapons Division
Oliver Bimber, Bauhaus-Universität Weimar
Victoria Interrante, University of Minnesota

Research Demo Chairs
Yoshifumi Kitamura, Osaka University
Laura Monroe, Los Alamos National Laboratories
Dirk Reiners, University of Louisiana at Lafayette
Simon Richir, Laval Virtual
Greg Welch, University of North Carolina at Chapel Hill

Exhibits Chairs
Haruo Noma, ATR International
John Quarles, University of Texas at San Antonio
Albert (Skip) Rizzo, University of Southern California

Student Volunteer Chairs
Sabarish Babu, Clemson University
Clifford Lindsay, Worcester Polytechnic Institute
Amy Ulinski, Clemson University

Publication Chairs
Adam Jones, Mississippi State University
Chad Wingrave, University of Central Florida

Finance Chair
Nicholas Polys, Virginia Tech

Web Chair
Clifford Lindsay, Worcester Polytechnic Institute

Local Arrangements Chairs
Paulo de Barros Worcester Polytechnic Institute
Jeffrey Jacobson, PublicVR

HAPTICS SYMPOSIUM COMMITTEE

General Chairs
Karon MacLean, University of British Columbia
Allison Okamura, Johns Hopkins University

Publications Chair
Cagatay Basodogan, Koc University

Demos, Posters & Exhibits Chairs
Katherine Kuchenbecker, University of Pennsylvania
Mark Colton, Brigham Young University

Awards Chair
Jaydev Desai, University of Maryland

Publicity Chair
William Provancher, University of Utah

Local Arrangements Chairs
John Morrell, Yale University
Greg Fischer, Worcester Polytechnic University

3DUI SYMPOSIUM COMMITTEE

General Chairs
Martin Hachet, INRIA
Kiyoshi Kiyokawa, Osaka University
Joseph J. LaViola Jr., University of Central Florida

Contest Chairs
Pablo Figueroa, Universidad de los Andes
Sébastien Kuntz, Virtools / Dassault Systèmes
Yoshifumi Kitamura, Osaka University

Poster Chairs
Raphael Grasset, HITLabNZ
Daniel F. Keefe, University of Minnesota
Alexander Kulik, Bauhaus-Universität Weimar

Web Chair
Clifford Lindsay, Worcester Polytechnic Institute
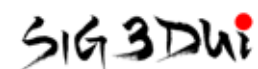
SPONSORS

Diamond

Platinum

Gold

Silver

Bronze

Supporters

SATURDAY | SUNDAY | MONDAY

Time	Saturday			Sunday			Monday		
7:00									
7:30	*Eden Vale Foyer*			*Eden Vale Foyer*			*Eden Vale Foyer*		
8:00	Breakfast			Breakfast			Breakfast		
	TUTORIALS	**WORKSHOPS**		**TUTORIALS**	**WORKSHOPS**		**VR**		
8:30	*Cambridge* **Tutorial 1:** Controlling Your World: Scripting in Second Life (Hands On Tutorial) (8:30 am - 5:30 pm)	*Alcott* **Workshop 1:** Cloud-Mobile Convergence for Virtual Reality (CMCVR) (8:30 am - 5:30 pm)	**3DUI** *Eden Vale A/B* Introduction & Keynote Speaker	*Lincoln* **Tutorial 4:** Designing Immersive VR Systems: From Bits to Bolts (8:30 am - 12:30 pm)	*Alcott* **Workshop 2:** SEARIS: 3rd Workshop on Software Engineering and Architectures for Real-time Interactive Systems (8:30 am - 5:30 pm)	**3DUI** *Eden Vale A/B* Papers 4: **Show On & Show Through**	*Eden Vale Ballroom* Opening Remarks		
9:00						*Eden Vale A/B* Papers 5: Hardware Interfaces	*Eden Vale Ballroom* Papers 1: AR Studies	*Concord Ballroom*	*Cambridge & Lincoln*
9:30									
10:00									
10:30		*Lincoln* **Tutorial 2:** Developing VR Applications with the inVRs Framework (8:30 am - 12:30 pm)	*Eden Vale Foyer* Break		*Cambridge* **Workshop 3:** Medical Virtual Environments (8:30 am - 12:30 pm)	*Eden Vale Foyer* Break	*Eden Vale Ballroom/ Concord* Demo FF & Break		
11:00			*Eden Vale A/B* Papers 1: Games & Music			*Eden Vale A/B* Papers 6: Manipulating Augmented Reality	*Eden Vale Ballroom* Papers 2: Interaction		*VR Research Demos*
11:30								*VR Exhibits*	
12:00			Poster FF (12 pm - 12:15 pm)						
12:30									
1:00	*Lincoln* **Tutorial 3:** Walking through Virtual Worlds: One Virtual Step for Man, One Giant Leap for VR? (Hands On Tutorial)(1:30 pm - 5:30 pm)		Lunch Break		*Cambridge* **Workshop 4:** PIVE: Perceptual Illusions in Virtual Environments (1:30 pm - 5:30 pm)	Lunch Break	Lunch Break		
1:30			*Eden Vale A/B* Papers 2: Travel	*Lincoln* Tutorial 5: Building your own Projection-based VR Display system (1:30 pm - 5:30 pm)		*Eden Vale A/B* Papers 7: Multi-Display & Multi-Touch			
2:00							*Eden Vale Ballroom* Papers 3: Gestures		
2:30									
3:00			*Eden Vale Foyer* Poster Viewing & Break			*Eden Vale C & Eden Vale Foyer* Contest / Demos & Break (2:30 pm - 4:30 pm)			
3:30							*Eden Vale Ballroom/ Concord* Poster FF & Break		
4:00			*Eden Vale A/B* Papers 3: Selection, Manipulation & Control			*Eden Vale A/B* Awards & Closing (4:30 pm - 4:45pm)	*Eden Vale Ballroom* Papers 4: AR Applications	*Emerson* Panel: What is VR?	
4:30									
5:00									
5:30									
				VR			*WPI Open House* Buses from 5:45 pm - 7 pm		
6:00				*Concord Ballroom* VR Welcome Reception (6 pm - 10 pm)					
6:30							WPI Open House and Live Demos Reception (food provided) (7 pm - 10:45 pm)		
7:00									
7:30									
8:00									
8:30									
9:00									

Conference Schedule

TUESDAY

Eden Vale Foyer
Breakfast

VR

Eden Vale Ballroom — Keynote Speaker

Concord Ballroom — Break

Eden Vale Ballroom — Papers 5: Presence

Lunch Break

Eden Vale Ballroom — Papers 6: VR Applications

Concord Ballroom — Break

Eden Vale Ballroom — Papers 7: Multi-Modal Interfaces
Emerson — Panel: Design for the Experience?!

(Concord Ballroom / Cambridge & Lincoln: VR Exhibits; VR Research Demos)

Eden Vale Foyer — Posters

Eden Vale Ballroom — Dinner Banquet

WEDNESDAY

Eden Vale Foyer
Breakfast

VR

Eden Vale Ballroom — Papers 8: Collaboration & Distribution

Concord Ballroom — Break

Eden Vale Ballroom — Papers 9: Perception

Lunch Break

Eden Vale Ballroom — Papers 10: Tracking

Concord Ballroom — Break

Eden Vale Ballroom — Papers 11: Graphics (3:45 pm - 5 pm)

Best Paper & Closing (5 pm - 5:30 pm)

(Concord Ballroom / Cambridge & Lincoln: VR Exhibits; VR Research Demos)

HAPTICS

Eden Vale Ballroom — Haptics Welcome Reception

THURSDAY

Eden Vale Foyer
Breakfast

HAPTICS

Eden Vale A/B — Oral 1: Technology: Tactile and Fingertip Systems

Eden Vale A/B — Teasers: Posters/Demos 1

Eden Vale Foyer, Eden Vale C & Emerson — Break, Poster & Demo viewing

Lunch Break

Eden Vale A/B — Oral 2: Humans: Human Haptic Perception and Performance

Eden Vale A/B — Teasers: Posters/Demos 2

Eden Vale Foyer, Eden Vale C & Emerson — Break, Poster & Demo viewing

Lobby — From 5:50 pm - 6:10 pm buses will be departing for the Museum of Science

Museum of Science — Haptics Banquet (Sponsored by SensAble Technologies; 6:30 pm - 9:30 pm) ; Buses depart Museum of Science to conference hotel at 10pm

FRIDAY

Eden Vale Foyer
Breakfast

HAPTICS

Eden Vale A/B — Oral 3: Technology: Kinesthetic Haptic Systems

Eden Vale Foyer, Eden Vale C & Emerson — Break, Poster & Demo viewing

Eden Vale A/B — Oral 4: Applications: Haptics in Guidance

Lunch Break

Eden Vale A/B — Spotlight on Industry: The Future of Interaction in Mobile Devices

Eden Vale A/B — Oral 5: Applications: Haptics in Medical and Rehabilitation Applications

Award Ceremony and Closing (4:30 pm - 5 pm)

Time Column

7:00, 7:30, 8:00, 8:30, 9:00, 9:30, 10:00, 10:30, 11:00, 11:30, 12:00, 12:30, 1:00, 1:30, 2:00, 2:30, 3:00, 3:30, 4:00, 4:30, 5:00, 5:30, 6:00, 6:30, 7:00, 7:30, 8:00, 8:30, 9:00

▶ SATURDAY MARCH 20

7:30 am - 8:30 am

Eden Vale Foyer

☐ Breakfast

TUTORIALS

8:30 am - 5:30 pm

Cambridge

☐ **Tutorial 1:** Controlling Your World: Scripting in Second Life (Hands On Tutorial)

8:30 am - 12:30 pm

Lincoln

☐ **Tutorial 2:** Developing VR Applications with the inVRs Framework

1:30 pm - 5:30 pm

Lincoln

☐ **Tutorial 3:** Walking through Virtual Worlds: One Virtual Step for Man, One Giant Leap for VR? (Hands On Tutorial)

WORKSHOPS

8:30 am - 5:30 pm

Alcott

☐ **Workshop 1:** Cloud-Mobile Convergence for Virtual Reality (CMCVR)

3DUI SYMPOSIUM

9:00 am - 9:15 am

Eden Vale A/B

☐ **Introduction**

9:15 am - 10:30 am

Eden Vale A/B

☐ **Keynote Speaker**
Interactive "Smart" Computers, Takeo Igarashi

10:30 am - 11:00 am

Eden Vale Foyer

☐ **Break**

11:00 am - 12:00 pm

Eden Vale A/B

☐ **Papers Session 1: Games & Music**
RealNav: Exploring Natural User Interfaces for Locomotion in Video Games, Brian Williamson, Chadwick Wingrave, Joseph J. LaViola Jr.
Evaluating Natural Interaction Techniques in Video Games [Technote], Ryan P. McMahan, Alexander Joel D. Alon, Shaimaa Lazem, Robert J. Beaton, David Machaj, Michael Schaefer, Mara G. Silva, Anamary Leal, Robert Hagan, Doug A. Bowman
Piivert: Percussion-based Interaction for Immersive Virtual EnvironmenTs [Technote], Florent Berthaut, Martin Hachet, Myriam Desainte-Catherine

12:00 pm - 12:15 pm

Eden Vale A/B

☐ **Poster Fast Forward**

12:15 pm - 1:30 pm

☐ **Lunch Break**

1:30 pm - 2:45 pm

Eden Vale A/B

☐ **Papers Session 2: Travel**
Walking Up and Down in Immersive Virtual Worlds: Novel Interactive Techniques Based on Visual Feedback, Maud Marchal, Anatole Lécuyer, Gabriel Cirio, Laurent Bonnet, Mathieu Emily
Effects of Travel Technique and Gender on a Divided Attention Task in a Virtual Environment, Evan A. Suma, Samantha L. Finkelstein, Seth Clark, Paula Goolkasian, Larry F. Hodges
Virtual Collision Notification [Technote], Kristopher J. Blom, Steffi Beckhaus

2:45 pm - 4:00 pm

Eden Vale Foyer

☐ **Posters Viewing & Break**

4:00 pm - 5:00 pm

Eden Vale A/B

☐ **Papers Session 3: Selection, Manipulation & Control**
Revisiting Path Steering for 3D Manipulation Tasks, Lei Liu, Jean-Bernard Martens, Robert van Liere
An Evaluation of Menu Properties and Pointing Techniques in a Projection-based VR Environment [Technote], Kaushik Das, Christoph W. Borst
Audio Haptic Feedbacks for an Acquisition Task in a Multi-Target context [Technote], Bob Ménélas, Lorenzo Picinalli, Brian F. G. Katz, Patrick Bourdot

SUNDAY MARCH 21 ◀

7:30 am - 8:30 am

Eden Vale Foyer

☐ Breakfast

TUTORIALS

8:30 am - 12:30 pm

Lincoln

☐ **Tutorial 4:** Designing Immersive VR Systems: From Bits to Bolts

1:30 pm - 5:30 pm

Lincoln

☐ **Tutorial 5:** Building your own Projection-based VR Display System

WORKSHOPS

8:30 am - 5:30 pm

Alcott

☐ **Workshop 2:** SEARIS: 3rd Workshop on Software Engineering and Architectures for Realtime Interactive Systems

8:30 am - 12:30 pm

Cambridge

☐ **Workshop 3:** Medical Virtual Environments

1:30 pm - 5:30 pm

Cambridge

☐ **Workshop 4:** PIVE: Perceptual Illusions in Virtual Environments

3DUI SYMPOSIUM

8:45 am - 9:30 am

Eden Vale A/B

☐ **Papers Session 4: Show On & Show Through**
Improving Co-located Collaboration with Show-Through Techniques, Ferran Argelaguet, André Kunert, Alexander Kulik, Bernd Froehlich
Augmented Foam Sculpting for Capturing 3D Models, Michael R. Marner, Bruce H. Thomas

9:30 am - 10:30 am

Eden Vale A/B

☐ **Papers Session 5: Hardware Interfaces**

The Implementation of a Novel Walking Interface within an Immersive Display [Technote], David Swapp, Julian Williams, Anthony Steed

Contact Sensing and Interaction Techniques for a Distributed, Multimodal Floor Display [Technote], Yon Visell, Severin Smith, Alvin Law, Rishi Rajalingham, Jeremy R. Cooperstock

A Multi-Touch enabled Human-Transporter Metaphor for Virtual 3D Traveling [Technote], Dimitar Valkov, Frank Steinicke, Gerd Bruder, Klaus Hinrichs

10:30 am - 11:00 am

Eden Vale Foyer

☐ **Break**

11:00 am - 12:15 pm

Eden Vale A/B

☐ **Papers Session 6: Manipulating Augmented Reality**

What Do You Do When Two Hands Are Not Enough? Interactive Selection of Bonds Between Pairs of Tangible Molecules, Patrick Maier, Marcus Tönnis, Gudrun Klinker, Alexander Raith, Markus Drees, Fritz Kühn

An Empirical Evaluation of Virtual Hand Techniques for 3D Object Manipulation in a Tangible Augmented Reality Environment, Taejin Ha, Woontack Woo

AR-Mote: A wireless device for Augmented Reality Environment [Technote], Giandomenico Caruso, Guido Maria Re

12:30 pm - 1:30 pm

☐ **Lunch Break**

1:30 pm - 2:30 pm

Eden Vale A/B

☐ **Papers Session 7: Multi-Display & Multi-Touch**

Comparison of Multimodal Interactions in Perspective-corrected Multi-display Environment, Ryo Fukazawa, Kazuki Takashima, Garth Shoemaker, Yoshifumi Kitamura, Yuichi Itoh, Fumio Kishino

Extending the Virtual Trackball Metaphor to Rear Touch Input [Technote], Sven Kratz, Michael Rohs

The Design and Evaluation of 3D Positioning Techniques for Multi-touch Displays [Technote], Anthony Martinet, Géry Casiez, Laurent Grisoni

2:30 pm - 2:45 pm

Eden Vale A/B

☐ **Contest / Demos Introduction**

2:45 pm - 4:30 pm

Eden Vale C & Eden Vale Foyer

☐ **Contest / Demos & Break**

4:30 pm - 4:45 pm

Eden Vale A/B

☐ **Awards & Closing**

VR CONFERENCE

6:00 pm - 10:30 pm

Concord Ballroom

☐ **VR Welcome Reception**

▶ MONDAY MARCH 22

7:30 am - 8:30 am

Eden Vale Foyer

☐ Breakfast

VR CONFERENCE

8:30 am - 9:00 am

Eden Vale Ballroom

☐ **Opening Remarks**

9:00 am - 10:30 am

Eden Vale Ballroom

☐ **Paper Session 1: AR Studies**

Photorealistic Rendering for Augmented Reality: A Global Illumination and BRDF Solution, Saulo Pessoa, Guilherme Moura, João Lima, Veronica Teichrieb, Judith Kelner

The Role of Latency in the Validity of AR Simulation, Cha Lee, Scott Bonebrake, Tobias Höllerer, Doug A. Bowman

Performance Evaluation Method for Mobile Computer Vision Systems using Augmented Reality, Jonas Nilsson, Anders C.E. Ödblom, Jonas Fredriksson, Adeel Zafar, Fahim Ahmed

An Evaluation of Physical Affordances in Augmented Virtual Environments: Dataset Grounding and Magic Lens, Leonard D. Brown, Hong Hua

10:30 am - 11:00 am

Concord Ballroom

☐ **Break**

Eden Vale Ballroom

☐ **Research Demo Fast Forward**

11:00 am - 12:30 pm

Eden Vale Ballroom

☐ **Paper Session 2: Interaction**

Enabling Functional Validation of Virtual Cars Through Natural Interaction Metaphors, Mathias Moehring, Bernd Froehlich

Improved Redirection with Distractors: A Large-Scale-Real-Walking Locomotion Interface and its Effect on Navigation in Virtual Environments, Tabitha C. Peck, Henry Fuchs, Mary C. Whitton

Visual-Olfactory Display Using Olfactory Sensory Map, Aiko Nambu, Takuji Narum, Kunihiro Nishimura, Tomohiro Tanikawa, Michitaka Hirose

Effect Based Scene Manipulation for Multimodal VR Systems, Matthias Haringer, Steffi Beckhaus

Egocentric Space-Distorting Visualizations for Rapid Environment Exploration in Mobile Mixed Reality, Christian Sandor, Andrew Cunningham, Ulrich Eck, Donald Urquhart, Graeme Jarvis, Arindam Dey, Sebastien Barbier, Michael R. Marner, Sang Rhee

12:30 pm - 2:00 pm

☐ **Lunch Break**

2:00 pm - 3:15 pm

Eden Vale Ballroom

☐ **Paper Session 3: Gestures**

GUD WIP: Gait-Understanding-Driven Walking-In-Place, Jeremy D. Wendt, Mary C. Whitton, Frederick P. Brooks, Jr.

Breaking the Status Quo: Improving 3D Gesture Recognition with Spatially Convenient Input Devices, Michael Hoffman, Paul Varcholik, Joseph J. LaViola Jr.

Buttonless Clicking: Intuitive Select and Pick-release Through Gesture Analysis, Ali Choumane, Géry Casiez, Laurent Grisoni

3:15 pm - 3:45 pm

Concord Ballroom

☐ **Break**

Eden Vale Ballroom

☐ **Poster Fast Forward**

3:45 pm - 5:15 pm

Eden Vale Ballroom

☐ **Paper Session 4: AR Applications**

Virtually Augmenting Hundreds of Real Pictures: An Approach based on Learning, Retrieval, and Tracking, Julien Pilet, Hideo Saito

More Than Meets the Eye: An Engineering Study to Empirically Examine the Blending of Real and Virtual Color Spaces, Joseph L. Gabbard, Jason Zedlitz, J. Edward Swan II, Woodrow W. Winchester III

Twinkle: Interacting with Physical Surfaces Using Handheld Projector, Takumi Yoshida, Yuki Hirobe, Hideaki Nii, Naoki Kawakami, Susumu Tachi

In-Place Sketching for Content Authoring in Augmented Reality Games, Nate Hagbi, Raphaël Grasset, Oriel Bergig, Mark Billinghurst, Jihad El-Sana

3:45 pm - 5:45 pm

Emerson

☐ **Panel: What is VR?**

5:45 pm - 7:00 pm

Buses to WPI

7.00 pm - 10.45 pm

WPI

☐ **WPI Open House and Live Demos Reception (food provided)**

▶ TUESDAY MARCH 23

VR CONFERENCE

7:30 am - 8:30 am

Eden Vale Foyer

☐ **Breakfast**

8:45 am - 10:30 am

Eden Vale Ballroom

☐ **Keynote Speaker**
Breaking Down the Walls: The Future of Second Life, Howard Look

10:30 am - 11:00 am

Concord Ballroom

☐ **Break**

11:00 am - 12:30 pm

Eden Vale Ballroom

☐ **Paper Session 5: Presence**

Is the Rubber Hand Illusion Induced by Immersive Virtual Reality?, Ye Yuan, Anthony Steed

Virtual Experience Test: A Virtual Environment Evaluation Questionnaire, Dustin B. Chertoff, Brian Goldiez, Joseph J. LaViola, Jr

The Contribution of Real-Time Mirror Reflections of Motor Actions on Virtual Body Ownership in an Immersive Virtual Environment, Mar González-Franco, Daniel Pérez-Marcos, Bernhard Spanlang, Mel Slater

Avatar Self-Embodiment Enhances Distance Perception Accuracy in Non-Photorealistic Immersive Virtual Environments, Lane Phillips, Brian Ries, Michael Kaeding, Victoria Interrante

12:30 pm - 2:00 pm

☐ **Lunch Break**

2:00 pm - 3:15 pm

Eden Vale Ballroom

☐ **Paper Session 6: VR Applications**

Simulation of Genetic Inheritance in the Generation of Virtual Characters, Roberto C. Cavalcante Vieira, Creto Augusto Vidal, Joaquim B. Cavalcante-Neto

Multimodal Virtual Reality Application for the Study of Unilateral Spatial Neglect, Inna Tsirlin, Eve Dupierrix, Sylvie Chokron, Theophile Ohlmann, Sabine Coquillart

Can You Help Me Concentrate Room? , Mohamad Nadim Adi, David Roberts

VRACK - Virtual Reality Augmented Cycling Kit: Design and Validation, Richard Ranky, Mark Sivak, Jeffrey Lewis, Venkata Gade, Judith E. Deutsch, Constantinos Mavroidis

3:15 pm - 3:45 pm

Concord Ballroom

☐ **Break**

3:45 pm - 5:15 pm

Eden Vale Ballroom

☐ **Paper Session 7: Multi-Modal Interfaces**
Synthesizing Contact Sounds Between Textured Models, Zhimin

Ren, Hengchin Yeh, Ming C. Lin

Sound Synthesis and Evaluation of Interactive Footsteps for Virtual Reality Applications, Rolf Nordahl, Stefania Serafin, Luca Turchet

Auto-Calibration of Cylindrical Multi-Projector Systems, Behzad Sajadi, Aditi Majumder

3:45 pm - 5:45 pm

Emerson

☐ **Panel: Design for the Experience?!**

5:45 pm - 7:15 pm

Eden Vale Foyer

☐ **Posters**

8:00 pm - 10:45 pm

Eden Vale Ballroom

☐ **Dinner Banquet**

WEDNESDAY MARCH 24 ◀

VR CONFERENCE

7:30 am - 8:30 am

Eden Vale Foyer

☐ Breakfast

9:00 am - 10:30 am

Eden Vale Ballroom

☐ **Paper Session 8: Collaboration & Distribution**

Effects of Viewing Conditions and Rotation Methods in a Collaborative Tabletop AR Environment, Sangyoon Lee, Hong Hua

On Error Bound Estimation for Motion Prediction, Rynson W.H. Lau, Kenneth Lee

Mixed Reality in Virtual World Teleconferencing, Tuomas Kantonen, Charles Woodward, Neil Katz

Streaming 3D Shape Deformations in Collaborative Virtual Environment, Ziying Tang, Guodong Rong, Xiaohu Guo, B. Prabhakaran

10:30 am - 11:00 am

Concord Ballroom

☐ **Break**

11:00 am - 12:30 pm

Eden Vale Ballroom

☐ **Paper Session 9: Perception**

Change Blindness Phenomena for Stereoscopic Projection Systems, Frank Steinicke, Gerd Bruder, Klaus Hinrichs, Pete Willemsen

Influence of Tactile Feedback and Presence on Egocentric Distance Perception in Virtual Environments, Farahnaz Ahmed, Joseph D. Cohen, Katherine S. Binder, Claude L. Fennema

Detection Thresholds for Label Motion in Visually Cluttered Displays, Stephen D. Peterson, Magnus Axholt, Matthew Cooper, Stephen R. Ellis

Can You Stand on Virtual Grounds? A Study on Postural Affordances in Virtual Reality, Tony Regia-Corte, Maud Marchal, Anatole Lécuyer

12:30 pm - 2:00 pm

☐ **Lunch Break**

2:00 pm - 3:15 pm

Eden Vale Ballroom

☐ **Paper Session 10: Tracking**

Real-time Panoramic Mapping and Tracking on Mobile Phones, Daniel Wagner, Alessandro Mulloni, Tobias Langlotz, Dieter Schmalstieg

A Real-time Multi-cue Hand Tracking Algorithm Based on Computer Vision, Zhigeng Pan, Yang Li, Mingmin Zhang, Chao Sun, Kangde Guo, Xing Tang, Steven Zhiying Zhou

Markerless Tracking Using Polar Correlation of Camera Optical Flow, Prince Gupta, Niels da Vitoria Lobo, Joseph J. Laviola Jr.

3:15 pm - 3:45 pm

Concord Ballroom

☐ Break

3:45 pm - 5:00 pm

Eden Vale Ballroom

☐ **Paper Session 11: Graphics**

Real-Time Continuum Grass, Kan Chen, Henry Johan

Single-pass 3D Lens Rendering and Spatiotemporal "Time Warp" Example, Jan-Phillip Tiesel, Christoph W. Borst, Kaushik Das, Emad Habib

GPU Implementation of 3D Object Selection by Conic Volume Techniques in Virtual Environments, Tobias Rick, Anette von Kapri, Torsten Kuhlen

5:00 pm - 5:30 pm

Eden Vale Ballroom

☐ **Best Paper & Closing**

HAPTICS SYMPOSIUM

7.00 pm - 9.00 pm

Eden Vale Ballroom

☐ **Haptics Welcome Reception**

▶ THURSDAY MARCH 25

HAPTICS SYMPOSIUM

7:30 am - 8:30 am

Eden Vale Foyer

☐ **Breakfast**

8:30 am - 10:10 am

Eden Vale A/B

☐ **Oral 1: Technology: Tactile and Fingertip Systems**

Paper: A New Fabric-based Softness Display, Matteo Bianchi, Alessandro Serio, Enzo Pasquale Scilingo, Antonio Bicchi

Paper: 3D Force Prediction Using Fingernail Imaging with Automated Calibration, Thomas Grieve, Lucas Lincoln, Yu Sun, John M. Hollerbach, Stephen A. Mascaro

Paper: Design of Electrotactile Stimulation to Represent Distribution of Force Vectors, Katsunari Sato, Susumu Tachi

Abstract: Design of a Novel Finger Haptic Interface for Contact and Orientation Display, Massimiliano Solazzi, Antonio Frisoli, Massimo Bergamasco

Paper: Design of a Vibrotactile Display via a Rigid Surface, Yon Visell, Jeremy R. Cooperstock

Paper: High Frequency Acceleration Feedback Significantly Increases the Realism of Haptically Rendered Textured Surfaces, William McMahan, Joseph M. Romano, Amal M. Abdul Rahuman, Katherine J. Kuchenbecker

Paper: Emulating Human Attention-Getting Practices with Wearable Haptics, Matthew A. Baumann, Karon E. MacLean, Thomas W. Hazelton, Ashley McKay

10:10 am - 10:45 am

Eden Vale A/B

☐ **Teasers: Posters/Demos 1**

Using Force Sensors and Neural Models to Encode Tactile Stimuli as Spike-based Responses, Elmer K. Kim, Gregory J. Gerling, Scott A. Wellnitz, Ellen A. Lumpkin

Discrimination of Consonant Articulation Location by Tactile Stimulation of the Forearm, Elaine Y. Wong, Ali Israr, Marcia K. O'Malley

Characterization and Simulation of Tactile Sensors, Zachary Pezzementi, Erica Jantho, Lucas Estrade, Gregory D. Hager

Haptic Illusion of Elasticity by Tactile Suppression during Motor Activity, Taku Hachisu, Sayaka Oshima, Yuki Hashimoto, Hiroyuki Kajimoto

Demo: Haptic Illusion of Elasticity by Tactile Suppression during Motor Activity, Taku Hachisu, Sayaka Oshima, Yuki Hashimoto, Hiroyuki Kajimoto

Evaluating Populations of Tactile Sensors for Curvature Discrimination, Isabelle I. Rivest, Gregory J. Gerling

Haptic Figure-Ground Differentation via a Haptic Glance, Dianne Pawluk, Ryo Kitada, Aneta Abramowicz, Cheryl Hamilton, Susan J. Lederman

Dynamic Switching Control of Haptic Transmission Direction in Remote Control System, Tatsuya Watanabe, Yutaka Ishibashi, Norishige Fukushima, Shinji Sugawara

Virtual Object Manipulation System with Substitutive Display of Tangential Force and Slip by Control of Vibrotactile Phantom Sensation, Tatsuya Ooka, Kinya Fujita

Comparison of Three Designs for Haptic Button Edges on Touchscreens, Toni Pakkanen, Roope Raisamo, Jukka Raisamo, Katri Salminen, Veikko Surakka

A Finger Attachment to Generate Tactile Feedback and Make 3D Gesture Detectable by Touch Panel Sensor, Itsuo Kumazawa

An Initial Study of Visuohaptic Simulation of Point-charge Interactions, Jaeyoung Park, Kwangtaek Kim, Hong Z. Tan, Ron Reifenberger, Gary Bertoline, Tallulah Hoberman, Deborah Bennett

Interaction Control for a Brake Actuated Manipulator, Brian Dellon, Yoky Matsuoka

Haptic Interaction with Volumetric Datasets Using Surface-based Haptic Libraries, Silvio H. Rizzi, Cristian J. Luciano, P. Pat Banerjee

Design, Fabrication, and Testing of a Piezoresistive Hardness Sensor in Minimally Invasive Surgery, Masoud Kalantari, Mohammadreza Ramezanifard, Roozbeh Ahmadi, Javad Dargahi, Jozsef Kovecses

A Preliminary Experimental Study on Haptic Teleoperation of Mobile Robot with Variable Force Feedback Gain, Ildar Farkhatdinov, Jee-Hwan Ryu, Jinung An

Simplified Design of Haptic Display by Extending One-point Kinesthetic Feedback to Multipoint Tactile Feedback, Kouta Minamizawa, Domenico Prattichizzo, Susumu Tachi

Initial Study for Creating Linearly Moving Vibrotactile Sensation on Mobile Device, Jongman Seo, Seungmoon Choi

Demo: Linearly Moving Vibrotactile Sensation on Handheld Mobile Device, Jongman Seo, Seungmoon Choi

New Experimental Method based Biological Soft Tissue Modeling, Bummo Ahn, Jung Kim

Physically-Based Analytical Modelling of Deformable Haptic Environments, Kevin C. Walker, David Wang

Co-presentation of Force Cues for Skill Transfer via Shared-control Systems, Dane Powell, Marcia K. O'Malley

HITPROTO: a Tool for the Rapid Prototyping of Haptic Interactions for Haptic Data Visualization, Sabrina A. Panëels, Jonathan C. Roberts, Peter J. Rodgers

Haptic Guides in Cooperative Virtual Environments: Design and Human Performance Evaluation, Sehat Ullah, Paul Richard, Samir Otmane, Mickael Naud, Malik Mallem

IN-HAPTICS: Interactive Navigation using Haptics, Richard D. Walker IV, Sean B. Andersson, Calin A. Belta, Pierre E. Dupont

The QuickHaptics microAPI: Enabling Haptic Mashups, David Chen, Venkat Gourishankar, Curt Rawley, Georges Grinstein

Stiffness Modulation for Haptic Augmented Reality: Extension to 3D Interaction, Seokhee Jeon, Seungmoon Choi

Demo: Stiffness Modulation for Haptic Augmented Reality: Extension to 3D Interaction, Seokhee Jeon, Seungmoon Choi

Design and evaluation of a vibrotactile seat to improve spatial awareness while driving, John Morrell, Kamil Wasilewski

Demo: A Vibrotactile Seat and Driving Simulator for Improved Spatial Awareness, John Morrell, Kamil Wasilewski, Hari Vasudevan

Demo: Expressive, Wearable Haptic Displays, Matthew Pan, Matthew A. Baumann, Thomas W. Hazelton, Karon E. MacLean, Elizabeth A. Croft

Demo: Tactile Gaming Vest (TGV), Saurabh Palan, Ruoyao Wang, Nathaniel Naukam, Katherine J. Kuchenbecker

Demo: A Vibrotactile Feedback Approach to Posture Guidance, Ying (Jean) Zheng, John B. Morrell

Demo: Haptic Display via a Vibrating, Rigid Surface, Yon Visell, Guillaume Millet, Jeremy Cooperstock

Demo: The Haptic Board, Zhihao Jiang, Mohit Bhoite, Katherine J. Kuchenbecker

Demo: Dial-based Haptic Interface, Laehyun Kim, Wanjoo Park, Hyunchul Cho, Sehyung Park

Demo: MasterFinger-2: Multifinger Haptic Device for Virtual Object Manipulation, Pablo Cerrada, Manuel Ferre, Rafael Aracil, Jorge Barrio, Pablo García-Robledo

Demo: Haptic Negotiation and Role Exchange with the Haptic Board Game, S. Ozgur Oguz, Ayse Kucukyilmaz, Tevfik Metin Sezgin, Cagatay Basdogan

Demo: GPU-Based Haptic Rendering of 3D Smoke, Meng Yang, Jingwan Lu, Alla Safonova, Katherine J. Kuchenbecker

Demo: Interactive Simulation of Needle Insertion Using a Magnetic Levitation Haptic Interface, Bing Wu

Demo: Simulating Dental Procedures with a Magnetic Levitation Haptic Interface, Yu Ge

Demo: Virtual Reality Dental Simulator, DangXiao Wang, YuRu Zhang, WanLin Zhou, Ge Yu, Jun Wu, Hui Zhao

Demo: Haptic Bite Articulation, Venkat Gourishankar, Curt Rawley

Demo: Stiffness Shifting: Improving the Perceived Hardness of a Virtual Surface, Gabjong Han, Seokhee Jeon, Seungmoon Choi

Demo: Exchanging Tracking for Accurate Force Display in Multiple Degree-of-freedom Teleoperation, Paul Griffiths, Allison Okamura

Demo: Force Feedback Teleoperation for EOD Manipulation Tasks, Martin Buehler, Wes Huang, Mark Claffee, Emilie Phillips, Walt Aviles, Jonathan Miller

10:45 am - 12:15 pm
Eden Vale Foyer, Eden Vale C & Emerson

☐ **Break, Poster & Demo viewing**

Posters and demonstrations will be up during the whole conference.

12:15 pm - 1:45 pm

☐ **Lunch Break**

1:45 pm - 3:20 pm
Eden Vale A/B

☐ **Oral 2: Humans: Human Haptic Perception and Performance**

Paper: Perceptual Space and Adjective Rating of Sinusoidal Vibrations Perceived via Mobile Device, Inwook Hwang, Seungmoon Choi

Paper: Haptic Exploration of Spheres: Techniques and Initial Experiments, Blake Hannaford, Jesse Dosher, Sugandhan Venkatachalam

Abstract: Psychophysical Detection of Inclusions with the Bare Finger amidst Softness Differentials , Leigh A. Baumgart, Gregory J. Gerling, Ellen J. Bass

Paper: Human vs. Robotic Tactile Sensing: Detecting Lumps in Soft Tissue, James C. Gwilliam, Zachary Pezzementi, Erica Jantho, Allison M. Okamura, Steven Hsiao

Paper: Redundant Coding of Simulated Tactile Key Clicks with Audio Signals, Hsiang-Yu Chen, Jaeyoung Park, Hong Z. Tan, Steve Dai

Paper: Perceptual Representations of Parametrically-Defined and Natural Objects Comparing Vision and Haptics, Nina Gaißert, Christian Wallraven

Abstract: Effects of Kinesthetic Information on Working Memory for 2D Sequential Selection Task, Gabjong Han, Jaebong Lee, In Lee, Seokhee Jeon, Seungmoon Choi

3:20 pm - 3:50 pm
Eden Vale A/B

☐ **Teasers: Posters/Demos 2**

Exploring the Underlying Structure of Haptic-based Handwritten Signatures using Visual Data Mining Techniques, Nizar Sakr, Fawaz A. Alsulaiman, Julio J. Valdés, Abdulmotaleb El Saddik, Nicolas D. Georganas

Towards Real-Time Haptic Exploration using a Mobile Robot as Mediator, Chung Hyuk Park, Ayanna M. Howard

Haptic Characteristics of some Activities of Daily Living, Brittany Redmond, Rachel Aina, Tejaswi Gorti, Blake Hannaford

Haptic System for Hand Rehabilitation Integrating an Interactive Game with an Advanced Robotic Device, Mark Sivak, Ozer Unluhisarcikli, Brian Weinberg, Paolo Bonato, Constantinos Mavroidis

Demo: A Haptic System for Hand Rehabilitation Integrating an Interactive Game with a Robotic Device, Mark Sivak, Ozer Unluhisarcikli, Brian Weinberg, Paolo Bonato, Constantinos Mavroidis

Haptic System Design for MRI-Guided Needle Based Prostate Brachytherapy, Hao Su, Weijian Shang, Gregory A. Cole, Kevin Harrington, Gregory S. Fischer

Stability Analysis of Haptic Interfaces for Different Types of Sampled Signals and Virtual Environment Implementations, Amir Haddadi, Keyvan Hashtrudi-Zaad

Active Handrest for Precision Manipulation and Ergonomic Support, Mark A. Fehlberg, Brian T. Gleeson, Levi C. Leishman, William R. Provancher

Skin Nonlinearities and their Effect on User Perception for Rotational Skin StretchPete Shull, Karlin Bark, Mark Cutkosky

Cooperative Teleoperation Control with Projective Force Mappings, Pawel Malysz, Shahin Sirouspour

Design of a Haptic Simulator for Osteosynthesis Screw Insertion, Ann Majewicz, Jason Glasser, Rosemary Bauer, Stephen M. Belkoff, Simon C. Mears, Allison M. Okamura

Demo: Haptic Simulator for Osteosynthesis Screw Insertion, Ann Majewicz, Jason Glasser, Rosemary Bauer, Stephen Belkoff, Simon Mears, Allison Okamura

Finding a Feature on a 3D Object through Single-Digit Haptic Exploration, Kristina Huynh, Cara E. Stepp, Lee W. White, J. Edward Colgate, Yoky Matsuoka

Surface Waves and Spatial Localization in Vibrotactile Displays, Lynette A. Jones, David Held, Ian Hunter

A Two-grid Iterative Approach for Real Time Haptics Mediated Interactive Simulation of Deformable Objects, Venkata S Arikatla, Suvranu De

Dilatant Fluid Based Tactile Display -Basic Concept-, Satoshi Saga, Koichiro Deguchi

Perceptual Thresholds for Single vs. Multi-Finger Haptic Interaction, H. Hawkeye King, Regina Donlin, Blake Hannaford

NUVABAT: Northeastern University Virtual Ankle and Balance Trainer, Ye Ding, Mark Sivak, Brian Weinberg, Constantinos Mavroidis, Maureen Holden

Towards Physics-based Interactive Simulation of Electrocautery Procedures using PhysX, Zhonghua Lu, Ganesh Sankaranarayanan, Dhanannjay Deo, Dingfang Chen, Suvranu De

Demo: Laparoscopic Adjustable Gastric Banding Simulator, Ganesh Sankaranarayanan, Tansel Halic, Zhonghua Lu, James D. Adair, Daniel B. Jones, Suvranu De

Tactile Mouse Using Friction Control, Masaya Takasaki, Hiroyuki Kotani, Ryo Tamon, Takeshi Mizuno

Friction Measurements on a Large Area TPaD, Nicholas D. Marchuk, J. Edward Colgate, Michael A. Peshkin

Demo: The Large Area TPaD, Nicholas Marchuk, Dan Johnson, John Ware, J. Edward Colgate, Michael A. Peshkin

A Basic Study on Tactile Displays Using Velvet Hand Illusion, Yuji Kawabe, Abdullah Cham, Masahiro Ohka, Tetsu Miyaoka

Establishing Multimodal Telepresence Sessions using the Session Initiation Protocol (SIP) and Advanced Haptic Codecs, H. Hawkeye King , Blake Hannaford, Julius Kammerly, Eckehard Steinbachy

Spatially Distributed Tactile Feedback for Kinesthetic Motion Guidance, Pulkit Kapur, Mallory Jensen, Laurel J. Buxbaum, Steven A. Jax, Katherine J. Kuchenbecker

Modeling Pneumatic Bubble Displacements with Membrane Theory, Louis Kratchman, Jian Wen, Marc Michener, R. Brent Gillespie

A Higher Order Polynomial Reproducing Radial Basis Function Neural Network (HOPR-RBFN) for Real-time Interactive Simulations of Nonlinear Deformable Bodies with Haptic Feedback, Dhanannjay Deo, Suvranu De

Demo: T-Pod: A Novel Multi-modal Handheld Device with Fingertip Shear Feedback, William Provancher, Charles Stewart, Markus Montandon, Aaron Greer

Demo: A New Fabric-based Softness Display, Alessandro Serio, Matteo Bianchi, Enzo Pasquale Scilingo, Antonio Bicchi

Demo: A Mutual Tactile Communication Device by Controlling Air Pressure, Satuki Nakata, Yuki Hashimoto, Hiroyuki Kajimoto

Demo: Realistic Haptic Contacts and Textures for Tablet Computing, Joseph M. Romano, Katherine J. Kuchenbecker

Demo: Novel 4-State Programmable Brakes in a 2 DOF Passive Haptic Display, Yaroslav Tenzer, Brian L. Davies, Ferdinando Rodriguez y Baena

Demo: Low-cost Microcontroller Solutions for Haptic Device Motor Control, Ivan Figueroa, Alejandro Aguilar, Joel Huegel

Demo: Angle Tracking and Location At-home System for Bi-manual Rehabilitation (ATLAS-BR) Smart Glove, Mark Sivak, Avi Bajpai, Drew Lentz, Caitlyn Bintz, Andrew Clark, Jason Chrisos, Maureen K. Holden, Constantinos Mavroidis

Demo: A Novel Haptic-based Interface for Training Interventional Radiology Procedures, Chris Hughes, Nigel John

Demo: Fiber-Optic Intubation Simulator with Haptic Feedback, Ankur Baheti, Yuri Millo, Jaydev P. Desai

Demo: High-Frequency Tactile Feedback for the da Vinci Surgical System, Dorsey Standish, Jamie Gewirtz, William McMahan, Paul Martin, Katherine J. Kuchenbecker

3:50 pm - 5:20 pm
Eden Vale Foyer, Eden Vale C & Emerson

☐ **Break, Poster & Demo viewing**
Posters and demonstrations will be up during the whole conference.

5:50 pm - 6:10 pm
Lobby

☐ Buses depart for Museum of Science

6:30 pm - 9:30 pm
Museum of Science

☐ **Haptics Banquet**
Sponsored by SensAble Technologies; Buses depart Museum of Science for conference hotel at 10 pm.

▶ FRIDAY MARCH 26
HAPTICS SYMPOSIUM

7:30 am - 8:30 am
Eden Vale Foyer

☐ **Breakfast**

8:30 am - 9:50 am
Eden Vale A/B

☐ **Oral 3: Technology: Kinesthetic Haptic Systems**

Abstract: Enhancing Rate-hardness of Energy-bounding Algorithm by Considering Coulomb Friction of Haptic Interface, Jaeha Kim, Changhoon Seo, Jeha Ryu, Jong-Phil Kim

Paper: Unconditional Stability Analysis of Dual-user Teleoperation Systems, Behzad Khademian, Keyvan Hashtrudi-Zaad

Paper: An Iterative Approach to Optimizing Multi-user Networked Haptic Simulations, Sina Niakosari, Shahin Sirouspour

Paper: Measuring and Incorporating Slip in Data-Driven Haptic Rendering, Raphael Höver, Matthias Harders

Paper: Force and Contact Location Shading Thresholds for Smoothly Rendering Polygonal Models, Andrew J. Doxon, David E. Johnson, Hong Z. Tan, William R. Provancher

Abstract: Expressive Haptic Rendering with Cartoon-Inspired Effects, Brian Gleeson, David E. Johnson

9:50 am - 11:05 am
Eden Vale Foyer, Eden Vale C & Emerson

☐ **Break, Poster & Demo viewing**
Posters & demonstrations will be up during the whole conference.

11:05 am - 12:30 pm
Eden Vale A/B

☐ **Oral 4: Applications: Haptics in Guidance**

Paper: Effects of Haptic Guidance and Disturbance on Motor Learning: Potential Advantage of Haptic Disturbance, Jaebong Lee, Seungmoon Choi

Paper: Progressive Haptic and Visual Guidance for Training in a Virtual Dynamic Task, Joel C Huegel, Marcia K O'Malley

Paper: A Vibrotactile Feedback Approach to Posture Guidance, Ying (Jean) Zheng, John B. Morrell

Abstract: Torso-Based Tactile Feedback System for Patients with Balance Disorders, Steven W. Wu, Richard E. Fan, Christopher R. Wottawa, Eileen G. Fowler, James W. Bisley, Warren S. Grundfest, Martin O. Culjat

Paper: BlindAid: Virtual Environment System for Self-Reliant Trip Planning and Orientation and Mobility Training, David W. Schloerb, Orly Lahav, Joseph G. Desloge, Mandayam A. Srinivasan

Paper: Haptic Negotiation and Role Exchange for Collaboration in Virtual Environments, S. Ozgur Oguz, Ayse Kucukyilmaz, Tevfik Metin Sezgin, Cagatay Basdogan

12:30 pm - 2:00 pm

☐ **Lunch Break**

2:00 pm - 3:00 pm
Eden Vale A/B

☐ **Spotlight on Industry: The Future of Interaction in Mobile Devices**
Dr. Leo Kärkkäinen, Distinguished Scientist, Nokia

3:00 pm - 4:30 pm
Eden Vale A/B

☐ **Oral 5: Applications: Haptics in Medical and Rehabilitation Applications**

Paper: Fiber-Optic Intubation Simulator with Force Feedback, Ankur R. Baheti, Yuri Millo, Jaydev P. Desai

Paper: Haptic Noise Cancellation: Restoring Force Perception in Robotically-Assisted Beating Heart Surgery, Shelten G. Yuen, Karl-Alexander Dubec, Robert D. Howe

Paper: Gait Rehabilitation System for Stair Climbing and Descending, Hiroaki Yano, Shintaro Tamefusa, Naoki Tanaka, Hideyuki Saitou, Hiroo Iwata

Paper: Gait Rehabilitation Therapy Using Robot Generated Force Fields Applied at the Pelvis, M. Pietrusinski, I. Cajigas, Y. Mizikacioglu, M. Goldsmith, P. Bonato, C. Mavroidis

Paper: Haptic Gait Retraining for Knee Osteoarthritis Treatment, Pete Shull, Kristen Lurie, Mihye Shin, Thor Besier, Mark Cutkosky

Paper: ReFlex, a Haptic Wrist Interface for Motor Learning and Rehabilitation, Dominique Chapuis, Remco Benthem de Grave, Olivier Lambercy, Roger Gassert

4:30 pm - 5:00 pm
Eden Vale A/B

☐ **Award Ceremony and Closing**

IEEE TRANSACTIONS ON
HAPTICS

IEEE Transactions on Haptics (ToH) is a scholarly archival journal published quarterly that will address the science, technology and applications associated with information acquisition and object manipulation through touch. Haptic interactions relevant to this journal include all aspects of manual exploration and manipulation of objects by humans, machines and interactions between the two, performed in real, virtual, teleoperated or networked environments

CALL FOR PAPERS

ToH accepts regular, short and survey papers, as well as brief communications. Papers may be submitted online via:

mc.manuscriptcentral.com/th-cs

Detailed information for authors may be found at:

computer.org/toh

Research areas of relevance to this publication includes, but is not limited to, the following topics:

- Human haptic and multi-sensory perception and action
- Aspects of motor control that explicitly pertain to human haptics
- Haptic interactions via passive or active tools and machines
- Devices that sense, enable, or create haptic interactions locally or at a distance
- Haptic rendering and its association with graphic and auditory rendering in virtual reality
- Algorithms, controls, and dynamics of haptic devices, users, and interactions between the two
- Human-machine performance and safety with haptic feedback
- Haptics in the context of human-computer interactions
- Systems and networks using haptic devices and interactions, including multi-modal feedback
- Application of the above, for example in areas such as education, rehabilitation, medicine, computer-aided design, skills training, computer games, driver controls, simulation and visualization

IEEE

IEEE computer society

IEEE ROBOTICS AND AUTOMATION SOCIETY

IEEE CONSUMER ELECTRONICS SOCIETY