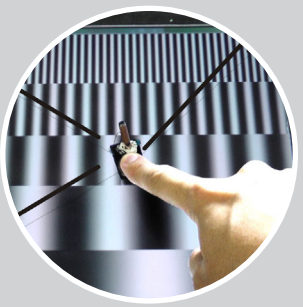


4-7 MARCH 2012

HAPTICS SYMPOSIUM 2012



VANCOUVER, BC, CANADA



PROGRAM AT-A-GLANCE

SUNDAY

MONDAY

7:00					
7:30					
8:00					Breakfast <i>Pavilion Foyer</i>
8:30	TUTORIALS <i>Pavilion Ballrm</i>	TUTORIALS <i>Pavilion Ballrm</i>	TUTORIALS <i>Pavilion Ballrm</i>	TUTORIALS <i>Pavilion Ballrm</i>	Program
9:00	Sensorimotor Neuro-physiology of Active Sensing, (8:30-11:30)	Machine Learning Methods for Human-Computer Interaction, (8:30-11:30)	Best Practices for Teaching Haptics, (8:30-12:00)	Haptic Hardware Evaluation Practices, (8:30-11:25)	Conference Opening (8:45-9:00) <i>Pavilion Ballroom C&D</i>
9:30					Paper Session 1: Moving Sideways - Lateral Displays
10:00					Poster/Demo Teaser 1 <i>Pavilion Ballroom C&D</i>
10:30					Poster/Demo Session 1 & Coffee Break <i>Exhibit Space</i>
11:00					
11:30					Opening Keynote <i>Pavilion Ballroom C&D</i>
12:00	Lunch Break				
12:30					Lunch Break
1:00	WORKSHOPS <i>Pavilion Ballrm</i>	WORKSHOPS <i>Pavilion Ballrm</i>	WORKSHOPS <i>Pavilion Ballrm</i>		
1:30	Tools and Techniques for Prototyping Haptic Interfaces, (13:00-16:45)	Affective Haptics, (13:00-17:15)	Haptic Interaction Design, (13:00-16:10)		
2:00					Paper Session 2: Creating Touch - Innovative Haptic Interfaces <i>Pavilion Ballroom C&D</i>
2:30					
3:00					
3:30					Poster/Demo Teaser 2 <i>Pavilion Ballroom C&D</i>
4:00					Poster/Demo Session 2 & Coffee Break <i>Exhibit Space</i>
4:30					
5:00					
5:30					
6:00	Welcome Reception & Demo/Poster Setup <i>Pavilion Foyer</i>				
6:30					
7:00					
7:30					
8:00					
8:30					
9:00					

TUESDAY

WEDNESDAY

		7:00
		7:30
Breakfast	<i>Pavilion Foyer</i>	8:00
		8:30
Program	Program	
Poster/Demo Teaser 3 (8:45-9:15)	<i>Pavilion Ballroom C&D</i>	9:00
Poster/Demo Session 3 & Coffee Break (9:15-11:00)	<i>Exhibit Space</i>	9:30
		10:00
		10:30
Invited Session on Haptic Human-Computer Interaction	<i>Pavilion Ballroom C&D</i>	11:00
		11:30
		12:00
Lunch Break		12:30
		1:00
		1:30
Paper Session 3: Technology Fundamentals - Sensors, Actuators and Control	<i>Pavilion Ballroom C&D</i>	2:00
		2:30
		3:00
Poster/Demo Session 4 & Coffee Break	<i>Exhibit Space</i>	3:30
		4:00
Paper Session 4: Delivering Touch - Force and Tactile rendering	<i>Pavilion Ballroom C&D</i>	4:30
Announcement of Hands-on Demonstrations Selected for the Media Session (17:30-17:35)		5:00
		5:30
		6:00
Banquet (transportation provided)	<i>Vancouver Aquarium</i>	6:30
		7:00
		7:30
		8:00
		8:30
		9:00

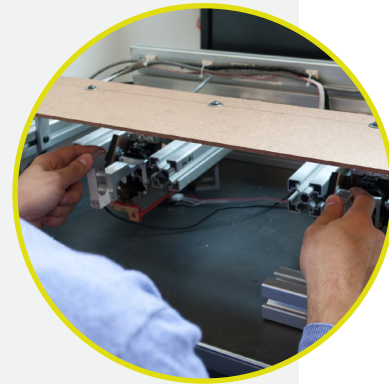
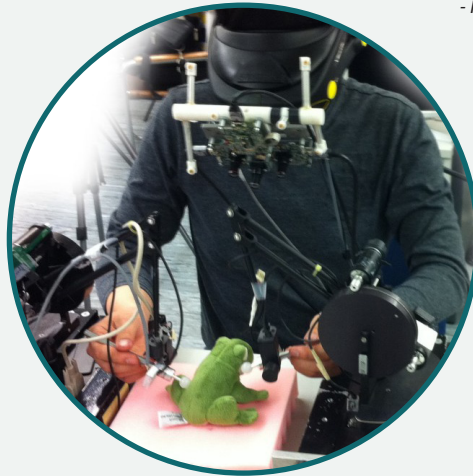
FROM THE SYMPOSIUM CHAIRS

Welcome to Vancouver and the 2012 IEEE Haptic Symposium! Celebrating 20 years since its inception in 1992, the Haptics Symposium now features a longer format than in years past. This year's conference special features include a day of workshops and tutorials, an opening keynote, an invited Session on Haptic Human-Computer Interaction, a special presentation looking back at our last 20 years, and closing ceremonies with sponsored awards. We hope you will enjoy the extended time for posters and hands-on demonstrations, along with networking opportunities at the welcome reception, banquet, and tours at UBC.

We would like to extend a special thank you to the Symposium's Organizing Committee members for their dedication in every aspect of making this an excellent and memorable experience; members were exceptionally generous with their time and creativity as they courageously "prototyped" many new responsibilities for this independent meeting. We are also grateful to the numerous companies who have contributed by sponsoring conference events and awards, and with commercial exhibits.

We hope you will take the time to enjoy the vibrant city of Vancouver while you are here, and that you find the conference to be exciting and inspiring.

- Karon MacLean and Marcia O'Malley



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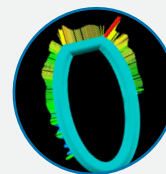
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PROGRAM DETAILS

► SUNDAY MARCH 4

TUTORIALS

08:30 - 11:30

Pavilion Ballroom

Sensorimotor Neurophysiology of Active Sensing

This tutorial is comprised of three 50-minute lectures on topics selected to provide the key background information needed to appreciate neural mechanisms for processing somatosensory information. Concepts include efference copy, receptor adaptation, spinal circuit operations, and multimodal cortical processing. Collated, hard copies of lecture notes will be provided. Each speaker will also give an introduction to his or her research program and invite questions.

08:30 - 11:30

Pavilion Ballroom

Machine Learning Methods for Human-Computer Interaction

In this tutorial, I will cover various machine learning methods for pattern recognition at an overview level illustrated with case studies mostly taken from haptics applications, and further lay out the space covered by other methods without reviewing them specifically. I will only talk about basic statistical pattern recognition methods applied for supervised learning; namely, Bayesian decision theory, linear discriminant, and k-nearest neighbor methods; emphasizing the distinction between generative and discriminative approaches. I will close by mentioning commonly used extensions of the introduced methods and by providing resources for the participants to follow up with. I will also provide some guidelines on parameter selection and optimization for the classifiers, which is still a research problem in pattern recognition.

08:30 - 12:00

Pavilion Ballroom

Best Practices for Teaching Haptics

As the field of haptics technology expands, both as a field of academic study and as an important component of interfaces in consumer and industrial products, there is an increasing need to educate the next generation of haptics researchers and practitioners. The maturation of some areas of haptics technology (in particular, kinesthetic interfaces) has over the last decade resulting in a set of principles/algorithms that provide a common framework for teaching and learning haptics. In addition, strategies for teaching and documenting successful techniques in emerging areas of haptic technology are needed.

08:30 - 11:25

Pavilion Ballroom

Haptic Hardware Evaluation Practices

With the plethora of haptic devices that are commercially available today, the question often arises: what device is "good enough" for a given application? Since haptics technology is being increasingly used for different applications such as computer games, surgical simulators, mobile phones etc., there is a clear need to understand hardware evaluation practices and their implications on device design, use and application. This workshop aims at meeting this need by establishing standard practices for evaluation of haptic hardware and by identifying significant benchmark metrics.

10:00 - 10:15

Pavilion Foyer

Coffee Break

11:45 - 12:45

Pavilion Foyer

Lunch

WORKSHOPS

13:00 - 16:45

Pavilion Ballroom

Tools and Techniques for Prototyping Haptic Interfaces

This workshop will present detailed information on the many tools and techniques currently available to prototype haptic interfaces. The workshop will consist of five presentations from researchers who have designed a wide variety of haptic interfaces. The presenters will provide a detailed review of sensors, actuators, control technologies, and fabrication methods. The materials will include example devices, schematics, instructions, hints and lessons learned. Each presenter will cover established methods as well as newer approaches. The materials will be made available in electronic format as a resource for participants after the workshop.

13:00 - 17:15

Pavilion Ballroom

Affective Haptics

Affective Haptics is the emerging area of research which focuses on the design of devices and systems that can elicit, enhance, or influence the emotional state of a human by means of sense of touch. Human emotions can be easily evoked by different cues, and the sense of touch is one of the most emotionally charged channels. Affective Haptics is a wide interdisciplinary area, strongly related to such fields as multimodal interfaces, affective computing, neuroscience, psychology, mediated communications, telepresence, robotics, etc.

13:00 - 16:10

Pavilion Ballroom

Haptic Interaction Design

Haptic interaction design is that phase of product development where one designs the interaction with the product that occurs through touch and manual control. This activity includes the design of the physical interaction components and devices, as well as the design of the modalities for interacting with them, also including the integration with other modalities as vision and sound (cross-modal interaction). The kind of interaction depends on the product attributes and on its functionalities, and also on the target users of the product. For example, the design of haptic interaction devoted to skilled users requires the acquisition of knowledge about the users' skills and dexterity, about the users' objectives in using the product, so as to best exploit the ways these users are used to do things and to perform manual tasks. Alternatively, one can design products integrating haptic and touch as a novel interaction modality, which proposes users a new way of doing the usual things. Or one can even design a novel physical interaction that aims at creating new emotional and compelling experiences for the potential future users of the product.

14:45 - 15:00

Pavilion Foyer

Coffee Break

18:00 - 21:00

Pavilion Foyer

Welcome Reception & Demo/Poster Setup

Appetizers, beer, and wine will be served.

▶ MONDAY MARCH 5

08:00-08:45

Pavilion Foyer

Breakfast

08:45-09:00

Pavilion Ballroom C&D

Conference Opening

Chairs: Karon MacLean & Marcia O'Malley

09:00-10:00


Pavilion Ballroom C&D


Paper Session 1: Moving Sideways - Lateral Displays


Chairs: Dong-Soo Kwon & Katherine Kuchenbecker

[001] Adaptive Level of Detail in Dynamic, Refreshable Tactile Graphics, Vincent Lévesque, Grégory Petit, Aude Dufresne, Vincent Hayward

[007] LateralPaD: A Surface-Haptic Device That Produces Lateral Forces on A Bare Finger, Xiaowei Dai, J. Edward Colgate, Michael A. Peshkin

 [015] Lateral-Force-Based 2.5-Dimensional Tactile Display for Touch Screen, Satoshi Saga, Koichiro Deguchi

 [023] Exploring the Design Space of Programmable Friction for Scrolling Interactions, Vincent Lévesque, Louise Oram, Karon MacLean

 [031] Surface Haptic Feature Attenuation due to Contact on Opposing Surface, Steven G. Manuel, Roberta L. Klatzky, Michael A. Peshkin, J. Edward Colgate

10:00-10:30

Pavilion Ballroom C&D


Poster/Demo Teaser 1

Chairs: Mark Colton & John Morrell

[331] Haptic Rendering of Dense 3D Point Cloud Data, Sreeni K G, Subhasis Chaudhuri

[339] Design and Validation of an Epidural Needle Insertion Simulator with Haptic Feedback for Training Resident Anaesthesiologists, Vinoth Manoharan, Dennis van Gerwen, John van den Dobbelen, Jenny Dankelman

[507] Composing Vibrotactile Music: A Multi-Sensory Experience with the Emoti-Chair, Anant Baijal, Julia Kim, Carmen Branje, Frank Russo, Deborah Fels

 [347/D15] Handheld Haptic Interface with Visual Display for Touching Remote Objects, Hiroaki Yano, Takeyuki Aoki, Hiroo Iwata


[515] Human-Operated 3D Micro-Manipulator with Haptic Feedback, Andreas Schmid, Ramesh Yechangunja, Stefan Thalhammer, Mandayam Srinivasan

[353] Presentation of Thermal Sensation through Preliminary Adjustment of Adapting Skin Temperature, Shimon Akiyama, Katsunari Sato, Yasutoshi Makino, Takashi Maeno

[357] Haptic Visualization of Bathymetric Data, Tatiana V. Evreinova, Grigori Evreinov, Roope Raisamo

[261] Experimentally Driven Design of a Palpating Gripper with Minimally Invasive Surgery Considerations, Adam Spiers, Sarah Baillie, Tony Pipe, Raj Persad

[267] Physically Co-Located Haptic Interaction with 3D Displays, Pontus Olsson, Fredrik Nysjö, Stefan Seipel, Ingrid Carlbom

 [363] Design of a Forearm-Mounted Directional Skin Stretch Device, Nathaniel Caswell, Ryan Yardley, Markus Montandon, William Provancher

[273] Evaluation of Active Handrest Performance using Labyrinths with Adaptive Admittance Control and Virtual Fixtures, Mark A. Fehlberg, Raymond J. King, Andrew J. Doxon, William R. Provancher

[369] Signal Processing Techniques for Haptic Data Compression in Teleoperation Systems, Jae-young Lee, Shahram Payandeh

[521] Haptics using a smart material for eyes free interaction in mobile devices, Huihui Wang, Dimosthenis Kaleas, Roger Ruus-pakka, Robert Tartz

[525/D48] HALO: Haptic Alerts for Low-hanging Obstacles in White Cane Navigation, Yunqing Wang, Eza Koch, Katherine Kuchenbecker

[375/D01] Constraint-Based Haptic Rendering of Point Data for Teleoperated Robot Grasp, Adam Leeper, Sonny Chan, Kaijen Hsiao, Matei Ciocarlie, Kenneth Salisbury

[D03] Authoring High Resolution Haptic Feedback on Touchpads, Seung-Chan Kim, Ali Israr, Ivan Poupyrev

[D09] "Haptinoid": bilateral tactile interaction with avatar through haptic gestures, Dzmitry Tsetserukou

[D12] Mediated Tactile Interaction, Loïc Deschamps, Gabrielle Le Bihan

[D18] ETHZ Haptic Paddle – Physical Student-Robot Interaction, Jean-Claude Metzger, Kaspar Leuenberger, Werner Popp, Mike Tucker, Bogdan Vigar, Raphael Zimmermann, Olivier Lambercy, Roger Gassert

[D21] A Vibrotactile Exergame Interface to Enable Spatial Perception for the Visually Impaired, Juan M. Silva, Abdulmotaleen El Saddik

[D24] VerroTeach: Visuo-Audio-Haptic Training for Dental Caries Detection, Margrit P. Maggio, Robert Parajon, Katherine J. Kuchenbecker

[D27] High Time Response Thermal Display Unit using Spatially Distributed Warm and Cold Stimuli, Katsunari Sato, Takashi Maeno

[D29] A Haptic Display for the Configuration of a Virtual Prosthetic Hand, Kirk A. Nichols, Heidi M. Weeks, Andrew Cheng, Allison M. Okamura

[D30] TECHTILE Toolkit, Kouta Minamizawa, Masashi Nakatani, Yasuaki Kakehi, Soichiro Mihara, Susumu Tachi

[D33] Skin Stretch Feedback Enabled Gaming Devices and Virtual Environments, Nathaniel A. Caswell, Ashley L. Guinan, Markus N. Montandon, Delian Asparouho, William R. Provancher

[D39] Lateral-Force-Based 2.5-Dimensional Tactile Display for Touch Screen, Satoshi Saga, Koichiro Deguchi

[D45] A Model of Haptic-Integrated Pronunciation Instruction, William Acton, Brian Teaman, Mike Burri, Olga Ulyasheva

10:30-11:30

Exhibit Space

Poster/Demo Session 1 & Coffee Break

11:30-12:30

Pavilion Ballroom C&D

Opening Keynote

Chair: Hong Tan

Everyone Feels Haptics (Happy),

Hsiao-Wuen Hon



12:30-14:00

Lunch

14:00-15:30

Pavilion Ballroom C&D

Paper Session 2: Creating Touch - Innovative Haptic Interfaces

Chairs: Yasuyoshi Yokokohji & William Provancher

[037] Recreating the Feel of the Human Chest in a CPR Manikin via Programmable Pneumatic Damping, Andrew A. Stanley, Simon K. Healey, Matthew R. Maltese, Katherine J. Kuchenbecker



[045] **Design and Control of an Air-Jet Lump Display**, James C. Gwilliam, Alperen Degirmenci, Matteo Bianchi, Allison M. Okamura



[051] **High-Fidelity Rendering of Virtual Objects with the ReHapticKnob – Novel Avenues in Robot-Assisted Rehabilitation of Hand Function**, Jean-Claude Metzger, Olivier Lambercy, Roger Gassert

[057] **A Haptically Accurate Practice Carillon**, Joseph B. Brink, Ying (Jean) Zheng, John B. Morrell



[065] **Thermal Bilateral Control for Reproduction of Thermal Contact between Remote Places**, Hidetaka Morimitsu, Seiichiro Katsura

[071] **A Three DoFs Wearable Tactile Display for Exploration and Manipulation of Virtual Objects**, Francesco Chinello, Monica Malvezzi, Claudio Pacchierotti, Domenico Prattichizzo

[077] **Co-located 3D Graphic and Haptic Display using Electromagnetic Levitation**, Peter Berkelman, Muneaki Miyasaka, Juaquin Anderson

15:30-16:00

Pavilion Ballroom C&D

Poster/Demo Teaser 2

Chairs: John Morrell & Greg Gerling

[279] **Improvement of Collaborative Selection in 3D Complex Environments**, Adrien Girard, Mehdi Ammi, Jean Simard, Malika Auvray

[531/D28] **Online Re-Mesh and Multi-Rate Deformation Simulation by GPU for Haptic Interaction with Large Scale Elastic Objects**, Kazuyoshi Tagawa, Yasuyuki Sasaki, Hiromi Tanaka

[287] **The Role of Visual-Haptic Discrepancy in Virtual Reality Environments**, Michele Scandola, Lorenza Gasperotti, Marco Vicentini, Paolo Fiorini



[383/D37] **Refined Methods for Creating Realistic Haptic Virtual Textures from Tool-Mediated Contact Acceleration Data**, Heather Culbertson, Joseph Romano, Pablo Castillo, Max Mintz, Katherine Kuchenbecker

[295] **Guidance Methods for Bimanual Timing Tasks**, In Lee, Kyungpyo Hong, Seungmoon Choi

[391/D31] **Tactile-Based Torque Illusion Controlled by Strain Distribution on Multi-finger Contact**, Lope Ben Porquis, Masashi Konyo, Satoshi Tadokoro

[397/D43] **Handwriting Transmission System Using Noncontact Tactile Display**, Takayuki Hoshi

[401] **Parametric Design of An Excitation Pattern for Smooth Vibrotactile Flow on Thin Plates**, Jeonggoo Kang, Kwangsu Cho, Jeha Ryu



[405] **ActivePaD Surface Haptic Device**, Joe Mullenbach, Dan Johnson, J. Edward Colgate, Michael Peshkin

[413] **On the Performance of Passivity-based Control of Haptic Displays Employing Levant's Differentiator for Velocity Estimation**, Vinay Chawda, Marcia O'Malley

[419/D07] **Illusory Perception of Arm Movement Induced by Visuo-Proprioceptive Sensory Stimulation and Controlled by Motor Imagery**, Daniele Leonardis, Antonio Frisoli, Massimiliano Solazzi, Massimo Bergamasco

[423/D40] **Haptic Footstep Display**, Ravikrishnan Jayakumar, Subhansu Mishra, John Dannenhoffer, Allison Okamura

[429] **An Adaptive System Model of Human Precision Grip**, Erik Engeberg

[299] **The Effects of Incongruent Feedback on Bimanual Task Performance**, Joel R. Cooper, Matthew M. Wernke, Kyle B. Reed

[437] **Effect of Artificial Skin Ridges on Embedded Tactile Sensors**, John-John Cabibihan, Htun Lin Oo, Saba Salehi

[D04] **Conductive Fur Sensing for a Gesture-Aware Furry Robot**, Anna Flagg, Diane Tam, Karon MacLean, Robert Flagg

[D08] **Exploring Presentation Timing through Haptic Reminders**, Diane Tam, Katherine J. Kuchenbecker, Karon MacLean, Joanna McGrenere

[D10] **Foottager: TouchPanel Mediated Footprint Massager**, Dzmitry Tsetselukou, Alena Neviarouskaya

[D13] **Second Generation Hand-Held Force Magnifier for Surgical Instruments**, G. Stetten, R. Lee, V. Shivaprabhu, B. Wu, J. Galeotti, R. Klatzky, M. Siegel, R. Hollis

[D16] **Transparent Electrodes for Electro-Tactile Display**, Hiroyuki Kajimoto

[D19] **A Haptically Accurate Practice Carillon**, Joey Brink, Ying (Jean) Zheng, John Morrell

[D25] **A Biofidelic CPR Manikin With Programmable Pneumatic Damping**, Andrew A. Stanley, Simon K. Healey, Matthew R. Maltese, and Katherine J. Kuchenbecker

[D32] **Programmable Friction in Scrolling Interactions**, Vincent Levesque, Louise Oram, Karon MacLean

[D34] **Tactile Suppression of Displacement Device**, Mounia Ziat, Vincent Hayward, Peter Pless, Chelsea Sicotte

[D36] **Simon Game with Data-Driven Visuo-Audio-Haptic Buttons**, Pablo Castillo, Joseph M. Romano, Katherine J. Kuchenbecker

[D46] **The Haptic Creature as a Platform to Study Emotional Touch and an Application in Anxiety Therapy**, Yasaman S. Sefidgar, Steve Yohanan, Karon E. MacLean, Elizabeth Croft, Machiel Van der Loos

[D49] **Vibrotactile Pose Guidance with HAPI Bands: A Haptic Augmented Posture Interface**, Zhan Fan Quek, Michele F. Rotella, Kelleher Guerin, Xingchi He, Allison M. Okamura

16:00-17:30

Exhibit Space

Poster/Demo Session 2 & Coffee Break

TUESDAY MARCH 6 ◀

08:00-08:45

Pavilion Foyer

Breakfast

08:45-09:15

Pavilion Ballroom C&D

Poster/Demo Teaser 3

Chairs: Mark Colton & Mike Zinn

[441/D44] **TWuiST: A Discrete Tactile-Proprioceptive Display for Eye and Ear Free Output on Mobile Devices**, Tony Morelli, Eelke Folmer

[449] **Haptic Interface with Hybrid Actuator for Virtual Needle Insertion and Tissue Cutting**, Berk Gonenc, Hakan Gurocak

[539/D11] **A Framework for Enhancing Video Viewing Experience with Haptic Effects of Motion**, Fabien Danieau, Julien Fleureau, Audrey Cabec, Paul Kerbirou, Philippe Guillotel, Nicolas Mollet, Marc Christie, Anatole Lecuyer

[305] **Audio-Haptic Intermodal Coupling for Comparative Search Tasks**, Mehdi Ammi, Brian Katz

[455] **Measuring Surface Wave Propagation During Vibrotactile Stimulation**, Lynette Jones, Katherine Sofia

[545/D22] **Lock Picking Simulation Using Visual and Bimanual Haptic Display**, Karl Arthur, Andrew Doxon, Courtney Parsons, William Provancher

[313/D38] **User Performance in Complex Bi-manual Haptic Manipulation with 3 DOFs vs. 6 DOFs**, Rene Weller, Gabriel Zachmann


[551] **Application of Haptic Feedback to a Combot**, Samuel McAmis, Kyle Reed

[557] **Using Publicly Known Passwords with Haptics and Biometrics User Verification**, Andrea Kanneh, Valerie Stoute, Michael Smith

[461/D47] **Haptic Actuator Design Parameters That Influence Affect and Attention**, Ying (Jean) Zheng, John Morrell

[469/D17] **Mobile Implementation and User Evaluation of the Huggy Pajama System**, James Teh, Zhenling Tsai, Jeffrey Koh, Adrian Cheok, Lai Sep Rieng, Pan Yi, Lin Wei Liang

[477/D41] **Shape Modeling of Soft Real Objects Using Force-Feedback Haptic Interface**, Sunghoon Yim, Seungmoon Choi

 [483/D14] **Design of a Transparent Tactile Stimulator**, Frederic Giraud, Michel Amberg, Betty Lemaire-Semail, Gery Casiez, Paolo Olivo, Nicolas Roussel

[489] **H_2 Controller Design of Networked Bilateral Teleoperation System with Markovian Time Delays**, Xiaotao Liu, Daniela Constantinescu, Yang Shi

[321] **Feasible Wrench Space and its Estimation for Isometric Haptic Interaction**, Timothy Edmunds, Reinhard Gentner, Andrea d'Avella, Dinesh Pai

[495] **Haptic Object Recognition for Multi-Fingered Robot Hands**, Stefan Escaida Navarro, Nicolas Gorges, Julian Schill, Tamim Asfour, Heinz Worn, Rudiger Dillmann

[561] **Evaluation of a Parallel Actuation Approach for MR-Compatible Haptics**, Chembian Parthiban, Christopher Esser, Michael Zinn

[501] **Experimental Evaluation of a Projection-Based Force Reflection Algorithm for Haptic Interfaces**, Ilia Polushin, Mir Zayed Hasan, Amir Takhmar

[327] **Contact Force Profiles Differ by Age During Tactile Letter Recognition with the Fingertip**, Sabah Master, Francois Tremblay

[569] **Physical Mobile Interaction with Kinesthetic Feedback**, Byung-Kil Han, Seung-Chan Kim, Soo-Chul Lim, Dongbum Pyo, Dong-Soo Kwon

[D02] **The Haptic Lotus – Haptics for Cultural Experience**, Adam Spiers, Janet Van Der Linden, Yvonne Rogers, Maria Oshodi

[D05] **Simple Haptics, sketching tools for haptic interaction design**, Camille Moussette

[D20] **Sensors: Towards Multisensory Tabletop Objects**, Joris Jansen, Alexander Toet, Jan van Erp

[D23] **StrokeSleeve: Real-Time Vibrotactile Feedback for Motion Guidance**, Karlin Bark, Elizabeth Cha, Frank Tan, Steven A. Jax, Laurel J. Buxbaum, Katherine J. Kuchenbecker

[D26] **Haptic Vibration Feedback for a Teleoperated Ground Vehicle**, Simon K. Healey, William McMahan, Katherine J. Kuchenbecker

[D35] **Smart Haptic Chair**, Myongchan Kim, Sungkil Lee, Seungmoon Choi

09:15-11:00

Poster/Demo Session 3 & Coffee Break

Exhibit Space

11:00-12:30

Pavilion Ballroom C&D

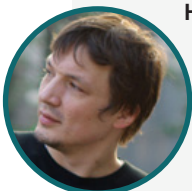
Invited Session on Haptic Human-Computer Interaction

Chairs: Ali Israr, Vincent Levesque, & Karon MacLean

Getting HCI in Touch and Touch in HCI, Desney Tan

Gravity + Multi-touch = 3D Tracking, Patrick Baudisch

Haptic Cloud, Ivan Poupyrev



12:30-14:00

Lunch

14:00-15:20

Pavilion Ballroom C&D

Paper Session 3: Technology Fundamentals - Sensors, Actuators and Control


Chairs: Dinesh Pai & Antonio Frisoli

[083] **A High Bandwidth Low Inertia Motor for Haptic Rendering Based on Clutched Eddy Current Effects**, Xinyi Ge, Shih-Kang Peng, Boyun Wang, Jonah Shapiro, Brent Gillespie, Curt Salisbury

[091] **On the Use of Postural Synergies to Improve Human Hand Pose Reconstruction**, Matteo Bianchi, Paolo Salaris, Armando Turco, Nicola Carbonaro, Antonio Bicchi

 [099] **Conductive Fur Sensing for a Gesture-Aware Furry Robot**, Anna Flagg, Diane Tam, Karon MacLean, Robert Flagg

[105] **Wave Filter Bank for High Fidelity Passive Multirate Haptic Interaction with Slowly Updated Virtual Environments**, Naser Yasrebi, Daniela Constantinescu

 [111] **Parameter-Space Transparency Analysis of Teleoperation Systems**, Thomas Schauß, Angelika Peer

[117] **Distributed Haptic Cooperation with Passive Multirate Wave Communications**, Ramtin Rakhsha, Daniela Constantinescu

[125] **Multilateral Teleoperation Control over Time-Delayed Computer Networks using Wave Variables**, Takahiro Kanno, Yasuyoshi Yokokohji

15:20-16:20

Exhibit Space

Poster/Demo Session 4 & Coffee Break


16:20-17:30

Pavilion Ballroom C&D

Paper Session 4: Delivering Touch - Force and Tactile rendering

Chairs: Vincent Hayward & Seungmoon Choi

[133] **Volume Haptic Rendering with Dynamically Extracted Iso-surface**, Loic Corenthy, Jose San Martin, Miguel A. Otaduy, Marcos Garcia

 [141] **Extending Haptic Augmented Reality: Modulating Stiffness during Two-Point Squeezing**, Seokhee Jeon, Matthias Harders

[147] **Haptic Simulation of Refrigerator Door**, Sunghwan Shin, In Lee, Hojin Lee, Gabjong Han, Kyungpyo Hong, Sunghoon Yim, Jongwon Lee, YoungJin Park, Byeong Ki Kang, Dae Ho Ryoo, Dae Whan Kim, Seungmoon Choi, Wan Kyun Chung

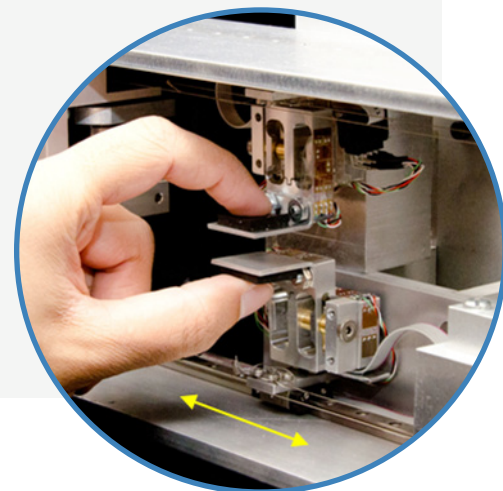
[155] **Conveying the Configuration of a Virtual Human Hand Using Vibrotactile Feedback**, Andrew A. Nichols, Heidi M. Weeks, Netta Guran, Allison M. Okamura

[163] **HAPI Bands: A Haptic Augmented Posture Interface**, Michele F. Rotella, Kelleher Guerin, Xingchi He, Allison M. Okamura

17:30-17:35

Pavilion Ballroom C&D

Announcement of Hands-on Demonstrations Selected for the Media Session



18:30-21:30

Vancouver Aquarium

Banquet

The Vancouver Aquarium is located in the heart of beautiful Stanley Park, in downtown Vancouver. It is Canada's largest aquarium, with over 50,000 animals and unique opportunities to come up close with some of the world's most elusive creatures. The Vancouver Aquarium is recognized internationally for the highest standards in animal and facility care, even inspiring unique policies and procedures in many other facilities around the world. More information about the Vancouver Aquarium is available at <http://www.vancouveraquarium.org/>.

The dinner will be served cocktail style. The menu includes cold and hot appetizers, main course (salmon station, sushi station, New Delhi station), assortment of deserts, coffee, tea and two drinks. Entertainment will include a dolphin show. Transportation from the hotel to the Aquarium and back will be provided.



[195] Comparison of Non-Volitional Postural Responses Induced by Two Types of Torso Based Vibrotactile Stimulations, Beom-Chan Lee, Bernard J. Martin, Kathleen H. Sienko

[199] Training Effects of a Visual Aid on Haptic Sensitivity in a Needle Insertion Task, Emilio Loren Roth Monzón, Amine Chellali, Cedric Dumas, Caroline G.L. Cao

[203] Maneuverability and Grasping Experiments in Teleoperation of Nonholonomic/Twin-Armed Robots, Pawel Malysz, Shahin Siru-spour

11:45-13:15

Lunch

13:15-14:15

Pavilion Ballroom C&D

A Haptics Symposium Retrospective: 20 Years - 1992 Inaugural Haptics Symposium Cochairs

Chair: Tim Salcudean
J. Edward Colgate and Bernard (Dov) Adelstein



▶ WEDNESDAY MARCH 7

08:45-10:30

Exhibit Space

Poster/Demo Session 5 & Media Session

08:45-10:30

Junior Foyer

Breakfast

10:30-11:45

Pavilion Ballroom C&D

Paper Session 5: Science Fundamentals - Perception, Cognition and Performance

Chairs: Lynette Jones and Matthias Harders

[171] Mental Rotation of Directional Tactile Stimuli, Brian T. Gleeson, William R. Provancher

[177] The More They Move the Less They Know: Cutaneous Capture of Kinesthesia?, George H. Van Doorn, Jakob Hohwy, Mark A. Symons, Jacqui Howell



[183] Somatosensory Anticipation of Curvature in a Haptic Virtual Environment, Julian J. Tramper, Stephen Stephens, Martha Flanders



[187] Co-Location of Force and Action Improves Identification of Force-Displacement Features, Jeremy D. Brown, R. Brent Gillespie, Duane Gardner, Emmanuel A. Gansallo

14:15-15:20

Pavilion Ballroom C&D

Paper Session 6: Fun and Useful - Novel Applications

Chairs: Allison Okamura & Daniela Constantinescu

[211] Modifying an Identified Curved Surface Shape Using Pseudo-Haptic Effect, Yuki Ban, Takashi Kajinami, Takuji Narumi, Tomohiro Tanikawa, Michitaka Hirose

[217] A Multisensory Illusion with Haptic Interaction to Treat Phantom Limb Pain, Mark W. Farrington, Gregory J. Gerling, Lynn R. Kohan, Sheryl L. Johnson

[223] Haptic Modules for Training in Palpatory Diagnosis, Ernur Karadogan, Robert L. Williams II

[231] Evaluation of Vibrotactile Pattern Design Using Vibrotactile Score, Jaebong Lee, Seungmoon Choi

[239] Interpersonal Recognition Through Mediated Tactile Interaction, Loïc Deschamps, Gabrielle Le Bihan, Charles Lenay, Katia Rovira, John Stewart, Dominique Aubert

[255] Bi-Manual Skin Stretch Feedback Embedded within a Game Controller, Ashley L. Guinan, Rebecca L. Koslover, Nathaniel A. Caswell, and William R. Provancher

15:20-16:00

Pavilion Ballroom C&D

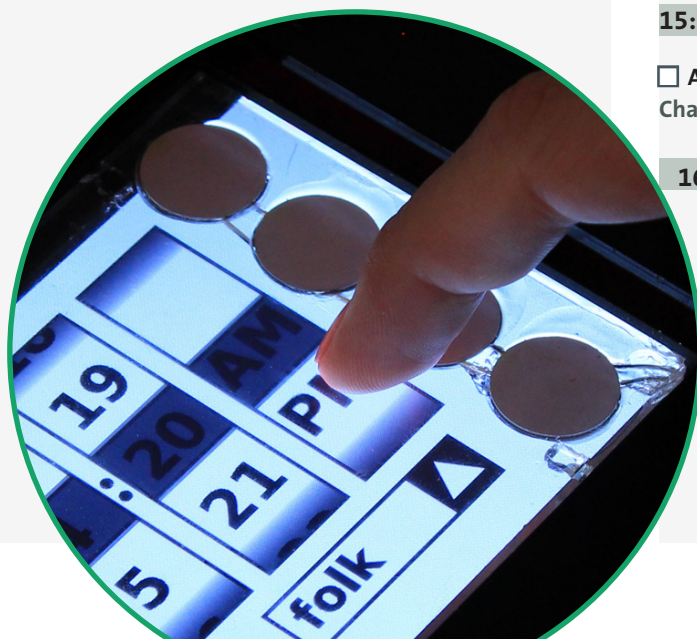
Award Ceremony and Closing

Chairs: Karon MacLean, Marcia O'Malley, & Hong Tan

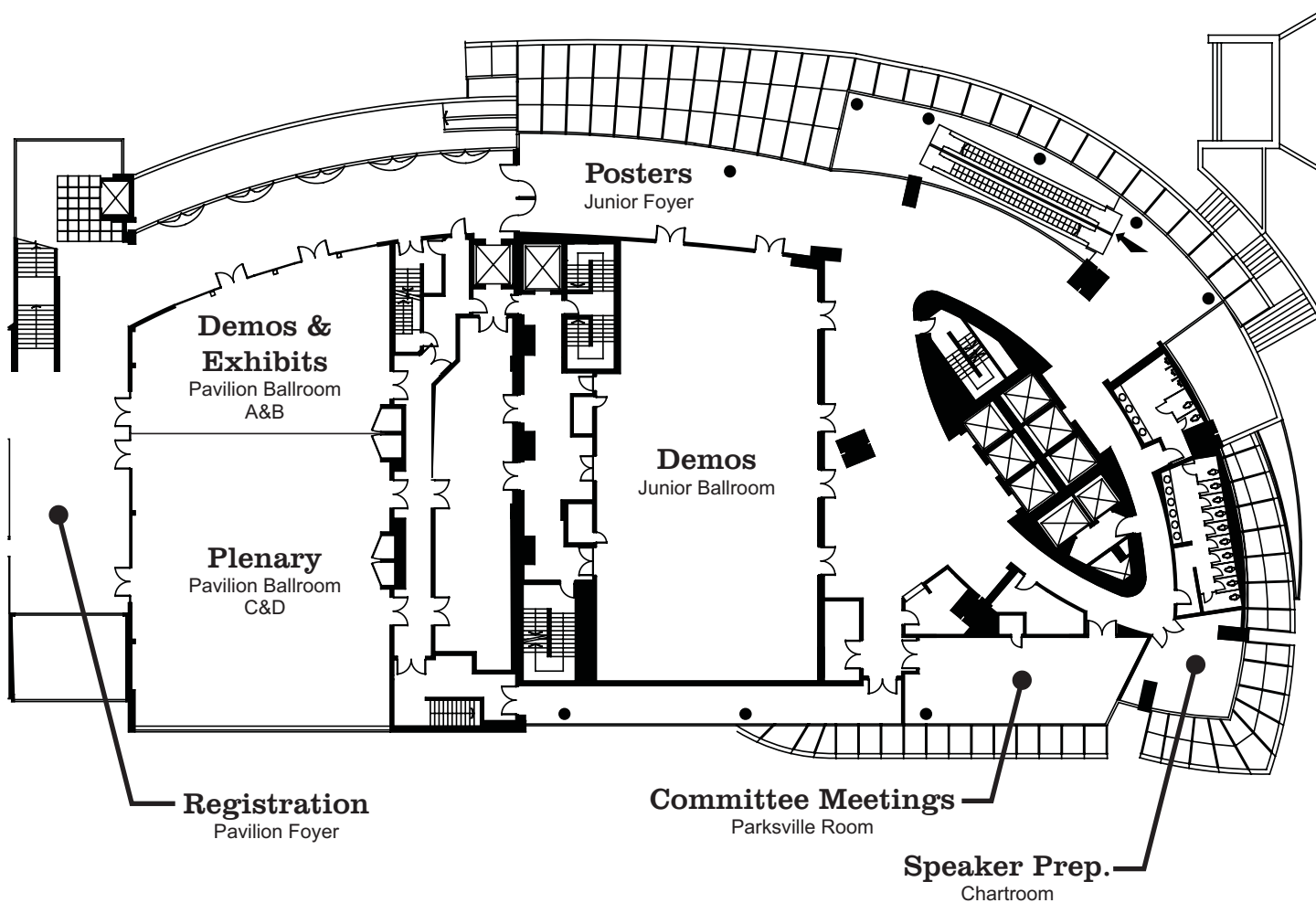
16:30-20:00

University of British Columbia

Post-conference Open House Demo Session at University of British Columbia, Transportation provided



Sheraton Wall Center North Tower - 3rd Floor

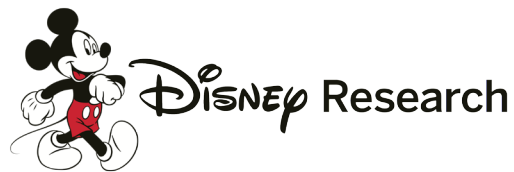


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The IEEE World Haptics Conference 2013,
5th Joint Eurohaptics Conference and IEEE Haptics Symposium

World Haptics Conference 2013

April 14-17, 2013 / Daejeon Convention Center, Daejeon, Korea

On behalf of the IEEE World Haptics 2013 Committee, we would like to invite you to be part of the 5th joint Eurohaptics Conference and IEEE Haptics Symposium. We invite your submission of new works in the following categories and inform a brief schedule of the conference:



Topic Category

- Haptic Interface Design & Control
- Teleoperation
- Tactile Display
- Sensors & Actuators
- Haptic Rendering
- Human Perception in Haptics
- Neurohaptics
- Applied Haptics to Culture/Life/Industry
- Innovative Application

Specialty Organized Session

- Haptics in Industry
- Haptics in Art



Important Date

- Initial Paper Submission Deadline
November 2, 2012
- Notification of Paper Acceptance
December 21, 2012

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- **Touch Your Brain!**
Daejeon Science Complex Tour
- **Taste, Rub, Tap & Breathe!**
Cultural Tour

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