<table>
<thead>
<tr>
<th>Time</th>
<th>Wednesday July 7th</th>
<th>Thursday July 8th</th>
<th>Friday July 9th</th>
<th>Saturday July 10th</th>
</tr>
</thead>
<tbody>
<tr>
<td>8:30</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8:45</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9:00</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9:15</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9:30</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9:45</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10:00</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10:15</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10:30</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10:45</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11:00</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11:15</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11:30</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11:45</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12:00</td>
<td>Lunch</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12:15</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12:30</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12:45</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13:00</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13:15</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13:30</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13:45</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14:00</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14:15</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14:30</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14:45</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15:00</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15:15</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15:30</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15:45</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16:00</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16:15</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16:30</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16:45</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17:00</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17:15</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17:30</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17:45</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18:00</td>
<td>Poster/Demo 2a</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18:15</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18:30</td>
<td>Closing</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18:45</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>19:00</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>19:15</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>19:30</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>19:45</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20:00</td>
<td>Poster/Demo 2b</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20:15</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20:30</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20:45</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>21:00</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>21:15</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>21:30</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>21:45</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>22:00</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>22:15</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>22:30</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>22:45</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>23:00</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Wednesday

Pre-conference workshops and special symposia

9.00–13.00 Communicative Functions of Haptic Feedback in Collaborative Settings

Organisers Eva-Lotta Sallnäs, Jonas Moll, and Jonas Forsslund

Location Room 06A04

Description In this workshop, concrete examples will be presented and discussed in terms of how the touch modality can support communication and collaboration. Also, the technical challenges of distributed haptic feedback will be addressed. The target audience of the workshop is researchers and practitioners focusing on haptic feedback supporting people in settings where more than one user are involved. We invite other researchers and practitioners to share their research and experience from their different projects focussing specifically on the collaborative perspective. It might be that the collaborative aspects in your project have not yet been addressed. In that case, interesting collaborative aspects can be identified during the discussions in this workshop.

9.00–16.00 Haptic and Audio-Visual Stimuli: Enhancing Experiences and Interaction

Organisers Anton Nijholt, Esko Dijk, Paul Lemmens, and Steven Luitjens

Speakers Saskia Bakker, Maud Marchal, Antal Haans, George Van Doorn, Hendrik Richter, Valeria Occelli, Ewoud Kuyper, Paul Lemmens, Esko Dijk, and Stefania Serafin

Location Room 11A06

Description In this symposium we address the specific effects of combined (multi-sensory) stimuli. Topics that are addressed range from the effect of mutual timing in audio, video and haptic stimuli, to actuator technologies, to how to such “more than the sum of the elements” effects of multimodal stimuli are created in a user’s perception. Guiding hypothesis is that an optimal user experience will be obtained by careful personalization and optimization (in an intelligent way) for the experience to be achieved taking into account human perception. The latter should be based on both general knowledge about human perception, and on (measured or inferred) knowledge about the individual user.

9.00–13.00 Measuring and evaluating haptic devices and user interaction

Organiser Thorsten Kern

Speakers Gunnar Jansson, Thorsten Kern, Ki-Uk Kyung, and Gerhard Weber

Location Rooms 08A04 and 10A04
Because of the very wide-ranging and varied nature of haptic devices, the part of the design process which deals with their validation and testing and, by implication, their compliance with standards and specifications is necessarily a complex area for consideration; probably an order of magnitude more complex than for visual displays. This workshop is organized by the members of the ISO standardization committee “Tactile and haptic interaction”. We invite the participants of this workshop to discuss in three small groups focusing on one topic (design process, hardware measures, user evaluation) to identify and name the major trends. The collected results will then be presented to all participants. The overall scope of the workshop is interactive, so we are looking forward to an intensive exchange of experience and visions.

13.00–14.00
Lunch

Lunch will be served in the Restaurant.

14.00–17.00
Bioinspired tactile sensing. Developing a biomimetic sensor based on nanoscale force transducers to mimic the resolution, sensitivity and dynamics of spatial touch in the human finger

Organisers Alan Wing and Mike Adams


Location Room 10A04

Description Biological tactile sensing is a key area of sensory processing in which the brain uses frequency and intensity coded neural signals from nanoscale receptors in the skin to determine the nature of environmental surfaces. This information is important for the perception through touch of surface features, for discriminating between surfaces in terms of their microgeometry (ie local shape and texture) and for the efficient control of grip, in which contact surface properties, together with forces normal to the surface, determine the tangential frictional forces that limit sliding of the digit. The workshop will take a multidisciplinary approach to tactile processing, introducing the techniques in non-specialist language and providing illustrative results in a series of short talks by specialists in each field.

14.00–17.00
System identification of neuromuscular, visual and vestibular feedback properties during haptic control

Organisers and speakers Frans van der Helm, David Abbink, and Herman Damveld

Location Room 08A04

Description Haptic feedback plays an important role during direct control of vehicles and airplanes, and in tele-operation. When vehicles and airplane have a steer-by-wire connection, the type of haptic feedback can be designed. In our tutorial we will present details about a control model incorporating neuromuscular properties, in combination with visual and vestibular properties. The neuromuscular feedback model comprises
intrinsic stiffness and viscosity, as well as position, velocity and force reflexive feedback. We will present details about system identification tools to identify the separate contribution of these feedback pathways, and to quantitatively estimate the parameter values. Ultimately, this approach will allow to optimize the haptic interface.

14.00–18.00  **Hidden Histories of Haptics**

**Organisers**  Marieke Sonneveld and Maarten Wijntjes

**Speakers**  Mark Paterson, Marieke Sonneveld, Vincent Hayward, and Robert Volčič

**Location**  Room 06A04

**Description**  One needs to know the history to understand the present. This workshop intends to share and discuss our scientific histories and increase the understanding about the fundamental scientific questions that drive the different disciplines involved in haptics. In this symposium four speakers from very different haptic domains (philosophy, design, engineering and psychophysics) will give a historical account of their field of research.

17.00–18.00  **Haptic Design in Architecture**

**Organisers and speakers**  Stephanie Davidson and Georg Rafailidis

**Location**  Room 11A06

**Description**  We founded Touchy-Feely in 2006 as a platform for exploring haptic design in architecture. As a specialized branch of our architecture practice, Davidson Rafailidis, Touchy-Feely has a specific orientation toward haptic design, objects and spaces, investigating how the built environment can relate to us in an immediate, physical and corporeal way. In this workshop, we will present a selection of our architecturally oriented haptic design work. In addition to our realized projects and design research, our presentation will look at precedents of hapticity embodied in historic and vernacular architectures as well as a more general discussion about using the human body as a design tool in architecture. The format of the session is a verbal and visual presentation with select models and objects being available to see and touch.

18.00–20.00  **Opening drinks and registration**

Drinks and snacks will be served in the Foyer. Registration takes place at the Registration Desk on the ground floor. See the plan on the inside front cover.
Welcome to EST, one of Europe’s leading distributors of Virtual Reality, Augmented Reality, and Visual Simulation hardware and software.

With over 15 years of experience in the business, EST serves a base of more than 2,000 customers in fields including research and development, education, automotive, aerospace, military, medicine, oil and gas, art, broadcast, and security.

Here’s what you can expect from EST and our comprehensive range of products and services:

**Fast, Expert Technical Support**
With EST you have access to a diverse spectrum of technical know-how. Our staff is regularly trained by manufacturers to give you the expert support and system advice you need – quickly and at no charge to you.

We also offer onsite training, system integration and maintenance contracts for your convenience. And you can count on our wide partner and know-how network throughout Europe.

**Products to Satisfy All Your Needs**
We distribute a broad range of over 500 products from more than 40 manufacturers – with many products and spare parts in stock. Volume stocking is also available for large-order contracts.

Our product lines include datagloves, eye tracking, head-mounted displays, eyewear, haptic devices, projection, tracking systems, software, and wearable computing.

At EST customer requirements are a top priority. So we work closely with manufacturers on prototyping and product changes, to adapt the products to our customers’ needs.

OEM customers can even take advantage of our logistics services for certain products. And you benefit from standardized shipping costs within the EU.

**We Show You What We Can Do**
EST exhibits regularly at trade shows and exhibitions all over Europe. You are also invited to visit our showroom and experience firsthand the wide range of equipment we offer.

**Comprehensive, Stand-Out Service**
Last but not least, as an EST customer you’ll enjoy our comprehensive service. We provide loaner systems, and can hold workshops or give product training at your facility. We also offer market screening services for the latest technologies. Our newsletter will keep you informed about new products, and give you updates about new driver releases and discontinued products. And maintenance-contract customers get VIP treatment with access to our special FAQ-site.

If you’d like further details about EST’s products or services, please feel free to contact us:

Phone: +49 631 36644 10
Fax: +49 631 36644 11
Email: info@est-kl.com
Web: http://www.est-kl.com

**Expert Technical Support**
- wealth of technical know-how
- manufacturer-trained staff
- quick response to requests
- support + system advice at no charge
- onsite training, system integration, maintenance contracts
- Europe-wide partner/know-how network

**Broad Range of Products**
- over 500 products from over 40 manufacturers
- many products + spare parts in stock
- volume stocking for large-order contracts
- product adaptation to customers’ needs
- logistics services for OEM customers
- standardized shipping costs within EU

**Services and Showroom**
- loaner systems
- workshops + product training
- market screening for latest technologies
- showroom with equipment
- regular exhibitor at trade shows/exhibitions
- newsletter with product info + updates
- FAQ-site for maintenance-contract customers

---

Create your Experience – with EST
Thursday

9.00–9.30  **Conference opening**

Prof. dr. Peter Beek, dean of the Faculty of Human Movement Sciences of the VU University, will open the conference.

9.30–10.30  **Oral session 1: Mass, weight, and elasticity**

*Chairs:* Karon MacLean and Knut Drewing

- Efficient Bimodal Haptic Weight Actuation
  Gunter Hannig and Barbara Deml
  Universität der Bundeswehr, Germany; Otto-von-Guericke-Universität, Magdeburg, Germany

- The Contribution of Proprioceptive and Cutaneous Cues in Weight Perception: Early Evidence for Maximum-Likelihood Integration
  Christos Giachritsis, Rachel Wright, and Alan Wing
  University of Birmingham, United Kingdom

- The shape-weight illusion
  Mirela Kahrimanovic, Wouter M. Bergmann Tiest, and Astrid M.L. Kappers
  Helmholtz Institute, Universiteit Utrecht, Netherlands

- Force-Based Calibration of a Particle System for Realistic Simulation of Nonlinear and Viscoelastic Soft Tissue Behavior
  Bektas Baybora Baran and Cagatay Basdogan
  College of Engineering, Koc University, Istanbul, Turkey

10.30–11.00  **Break**

11.00–12.30  **Oral session 2: Teleoperation**

*Chairs:* Eva-Lotta Sallnäs and Paul Lemmens

- A Coordinating Controller for Improved Task Performance in Multi-User Teleoperation
  Hiroyuki Tanaka, Thomas Schauß, Kouhei Ohnishi, Angelika Peer, and Martin Buss
  Department of System Design Engineering, Keio University, Japan; Institute of Automatic Control Engineering, Technische Universität München, Germany

- Mechatronic Design Optimization of a Teleoperation System based on Bounded Environment Passivity
  Bert Willaert, Brecht Corteville, Herman Bruyninckx, Hendrik Van Brussel, and Emmanuel Vander Poorten
  Department of Mechanical Engineering, K.U. Leuven, Belgium

- On the Impact of Haptic Data Reduction and Feedback Modality on Quality and Task Performance in a Telepresence and Teleaction System
  Verena Nitsch, Julius Kammerl, Berthold Faerber, and Eckehard Steinbach
  Universität der Bundeswehr, München, Germany; Technische Universität München, Germany
Stability Analysis of Mobile Robot Teleoperation with Variable Force Feedback Gain
Ildar Farkhatdinov and Jee-Hwan Ryu
Université Pierre et Marie Curie, France; Korea University of Technology and Education, South Korea

Transparency of the Generalized Scattering Transformation for Haptic Telepresence
Iason Vittorias and Sandra Hirche
Institute of Automatic Control Engineering (LSR), Technische Universität München, Germany

VerroTouch: High-Frequency Acceleration Feedback for Telerobotic Surgery
Katherine J. Kuchenbecker, Jamie Gewirtz, William McMahan, Dorsey Standish, Paul Martin, Jonathan Bohren, Pierre J. Mendoza, and David I. Lee
University of Pennsylvania, United States

12.30–13.30 Lunch
Lunch will be served in the Restaurant (see plan on inside front cover how to get there).

13.30–15.00 Oral session 3: Novel approaches
Chairs: Ki-Uk Kyung and William Harwin

Basic Properties of Phantom Sensation for Practical Haptic Applications
Hiroshi Kato, Yuki Hashimoto, and Hiroyuki Kajimoto
The University of Electro-Communications Department of Human Communication, Japan

Evaluation of Transmission System for Spatially Distributed Tactile Information
Katsunari Sato and Susumu Tachi
The University of Tokyo, Japan; Keio University, Japan

Electro-tactile Display with Real-time Impedance Feedback
Hiroyuki Kajimoto
University of Electro-Communications, Japan

Life Log System Based on Tactile Sound
Yasutoshi Makino, Masakazu Murao, and Takashi Maeno
Keio University, Japan

What is it like to be a rat? Sensory Augmentation study
Avraham Saig, Amos Arieli, and Ehud Ahissar
Department of Neurobiology, The Weizmann Institute of Science, Israel

Innovative Real-Time Communication System with Rich Emotional and Haptic Channels
Dzmitry Tsetserukou and Alena Neviarouskaya
Tohohashi University, Japan; University of Tokyo, Japan

15.00–15.30 Break
Oral session 4: Force and torque

Chairs: Thorsten Kern and Roope Raisamo

Haptic Perception of Viscosity
Wouter M. Bergmann Tiest, Anne C.L. Vrijling, and Astrid M.L. Kappers
Helmholtz Institute, Universiteit Utrecht, Netherlands; Royal Dutch Visio, National Foundation for the Visually Impaired and Blind, Huizen, Netherlands

Multi-Sensorial Interface for 3D Teleoperations at Micro and Nanoscale
Nicolas Venant, Antoine Niguès, Florence Marchi, Michal Hrouzek, Fabio Comin, Joël Chevrier, and Jean-Loup Florens
ICA-ACROE, France; Institut NEEL, CNRS Grenoble, France; Small Infinity, France; ESRF, Grenoble, France

Classifying Torque, Normal Force and Direction using Monkey Afferent Nerve Spike Rates
Stephen James Redmond, Ingvars Birznieks, Nigel H. Lovell, and Antony W. Goodwin
University of New South Wales, Australia; Prince of Wales Medical Research Institute, Australia; University of Melbourne, Australia

A New Coupling Scheme for Haptic Rendering of Rigid Bodies Interactions based on a Haptic Sub-World using a Contact Graph
Loeiz Glondu, Maud Marchal, and Georges Dumont
IRISA/INRIA Rennes, France

A new multi-DOF haptic device using a redundant parallel mechanism
Jumpei Arata, Norio Ikedo, and Hideo Fujimoto
Nagoya Institute of Technology, Japan

Break

Keynote: Patrick van der Smagt: From grasping to manipulation

Abstract: Grasping an object may be easy, even for a robotic hand with ample dexterity. It requires no more than a simple, possibly sensor-based model of the object and impedance-based control. But then what? This talk investigates parallels between human and robotic grasping and subsequent manipulation—and where the differences are. It will discuss from human manipulation without, up to robotic grasping with haptics—and find what one can learn from the other. What will future robotic hands be able to do?
more safe

TNO.NL

TNO works on a better future.
Also for a safe society.
Friday

9.00–10.30

**Oral session 5: Texture**

*Chairs:* Vincent Hayward and William Provancher

Fingernail-mounted Display of Attraction Force and Texture  
Masataka Niwa, Tomoko Nozaki, Taro Maeda, and Hideyuki Ando  
*Osaka University, Japan*

Contact force and duration effects on static and dynamic tactile texture discrimination  
Hoi Fei Kwok, Kerry Darkins, Calogero Oddo, Lucia Beccai, and Alan Wing  
*Univ. of Birmingham, United Kingdom; Polo Sant’Anna Valdera, Italy; Italian Institute of Technology, Italy*

Causality Inversion in the Reproduction of Roughness  
Michaël Wiertlewski, José Lozada, Edwige Pissaloux, and Vincent Hayward  
*CEA-LIST, France; ISIR, France*

Laterotactile Rendering of Vector Graphics with the Stroke Pattern  
Vincent Levesque and Vincent Hayward  
*University of British Columbia, Canada; UPMC, Univ. Paris 6, France*

Discrimination Capabilities of Professionals in Manual Skills in a Haptic Task not Related to Their Expertise  
Marcos Hilsenrat and Miriam Reiner  
*Technion-Israel Institute of Technology, Israel*

Modulations in low-frequency EEG oscillations in the processing of tactile surfaces  
Francisco Muñoz, Manuel Sebastián, José Manuel Reales, and Soledad Ballesteros  
*UNED, Madrid, Spain*

10.30–12.30

**Poster and demo session 1**

**Posters**

The numbers correspond to the poster location (see plan on inside front cover). Presenters of odd-numbered posters will be at their poster during the morning session. Presenters of even-numbered posters will be at their posters during the afternoon session.

P 1. Estimation of Normal and Tangential Manipulation Forces by Using Contact Force Sensors  
Ignacio Galiana, Marta Bielza, and Manuel Ferre  
*Universidad Politécnica de Madrid, Spain*

P 2. Modeling and Experimental Studies of a Novel 6-DOF Haptic Device  
Zhouming Tang and Shahram Payandeh  
*Experimental Robotics Laboratory, Canada; Experimental Robotics and Graphics Laboratory, Simon Fraser University, Canada*

P 3. Inertial force display to represent content inside the box  
Yuichiro Sekiguchi, Satoru Matsuoka, and Koichi Hirota  
*Univ. of Tokyo, Japan*

P 4. Perception of stiffness during interaction with delay-like nonlinear force field  
Raz Leib, Ilana Nisky, and Amir Karniel  
*Biomedical Engineering Department, Ben-Gurion University of the Negev, Israel*
P 5. Improving the Prediction of Haptic Impression User Ratings Using Perception-based Weighting Methods: Experimental Evaluation
Christian Hatzfeld, Thorsten A. Kern, and Roland Werthschützky
Technische Universität Darmstadt, Germany

P 6. Vibrotactile Force Perception Thresholds at the Fingertip
Christian Hatzfeld and Roland Werthschützky
Technische Universität Darmstadt, Germany

Serter Yilmaz, Ilhan Konukseven, and Hakan Gurocak
METU Mechanical Engineering, Turkey; Washington State University, United States

P 8. A Turing-like Handshake Test for Motor Intelligence
Amir Karniel, Ilana Nisky, Guy Avraham, Bat-Chen Peles, and Shelly Levy-Tzedek
Ben-Gurion University, Israel

P 9. The Influence of Different Haptic Environments on Time Delay Discrimination in Force Feedback
Markus Rank, Zhuanghua Shi, Hermann J. Müller, and Sandra Hirche
Technische Universität München, Germany

P 10. Perception and Action in Simulated Telesurgery
Ilana Nisky, Assaf Pressman, Carla M. Pugh, Ferdinando A. Mussa-Ivaldi, and Amir Karniel
Biomedical Engineering, Ben Gurion University of the Negev, Israel; Feinberg School of Medicine, Northwestern University, United States; Sensory Motor Performance Program, Rehabilitation Institute of Chicago, United States

P 11. Parallel Kinematics for Haptic Feedback in Three Degrees of Freedom: Application in a Handheld Laparoscopic Telemanipulation System
Sebastian Kassner and Roland Werthschützky
Technische Universität Darmstadt, Germany

P 12. Online Intention Recognition in Computer-Assisted Teleoperation Systems
Nikolay Stefanov, Angelika Peer, and Martin Buss
TU München, Germany

P 13. Tactile vs Graphical Authentication
Ravi Kuber and Wai Yu
UMBC, United States; Thales, United Kingdom

P 14. Haptics can “lend a hand” to a bionic eye
Barry Richardson and George Van Doorn
Monash University, Australia

P 15. Analysis of Active Handrest Control Methods
Mark Fehlberg, Brian T. Gleeson, and William R. Provancher
University of Utah, United States

P 16. Roly-poly: A Haptic Interface with a Self-righting Feature
Seung-Chan Kim, Byung-Kil Han, Soo-Chul Lim, Andrea Bianchi, Ki-Uk Kyung, and Dong-Soo Kwon
KAIST, South Korea; ETRI, South Korea

P 17. HaptiHug: a Novel Haptic Display for Communication of Hug over a Distance
Dzmitry Tsetsenokou
Toyohashi University, Japan
P 18. Physical contact of devices: Utilization of beats for interpersonal communication  
Soo-Chul Lim, Seung-Chan Kim, Jung-Hoon Hwang, and Dong-Soo Kwon  
KAIST, South Korea; KETI, South Korea

Anatole Lécuyer, Marco Congedo, Edouard Gentaz, Olivier Joly, and Sabine Coquillart  
INRIA, France; LPN-UPMF, France; CEA-LIST, France; INRIA-LIG, France

P 20. Dimensional Reduction of High-Frequency Accelerations for Haptic Rendering  
Nils Landin, Joseph M. Romano, William McMahan, and Katherine J. Kuchenbecker  
KTH Royal Institute of Technology, Sweden; University of Pennsylvania, United States

P 21. On multi-resolution point-based haptic rendering of suture  
Wen Shi and Shahram Payandeh  
Experimental Robotics and Graphics Laboratory, Simon Fraser University, Canada

P 22. Study of Performances of “Haptic Walls” Modalities for a 3D Menu  
Antonio Capobianco and Caroline Essert  
LSIT, France; INRIA, France

P 23. Spherical MR Brake with Nintendo Wii Sensors for Haptics  
Doruk Senkal and Hakan Gurocak  
Washington State University, United States

P 24. FlexTorque: Exoskeleton Interface for Haptic Interaction with the Digital World  
Dzmitry Tsetserukou, Katsunari Sato, and Susumu Tachi  
Toyohashi University, Japan; University of Tokyo, Japan; Keio University, Japan

P 25. A Laparoscopic Grasper Handle with Integrated Augmented Tactile Feedback, Designed for Training Grasp Control  
Eleonora Westebring-van der Putten, Mostafa Hajian, Richard Goossens, John van den Dobbelsteen, and Jack Jakimowicz  
TU Delft, Faculty of mechanical, maritime and materials engineering, Netherlands; Catharina Ziekenhuis Eindhoven, Netherlands

P 26. Collision Avoidance Control for a Multi-Fingered Bimanual Haptic Interface  
Takahiro Endo, Takashi Yoshikawa, and Haruhisa Kawasaki  
Gifu University, Japan

P 27. Optimization Criteria for Human Trajectory Formation in Dynamic Virtual Environments  
Sebastian Albrecht, Carolina Passenberg, Marion Sobotka, Angelika Peer, Martin Buss, and Michael Ulbrich  
Technische Universität München, Germany

P 28. Bodily Self-attribution Caused by Seeing External Body-resembling Objects and the Control of Grasp Forces  
Eleonora Westebring-van der Putten, Richard Goossens, Jenny Dankelman, and Jack Jakimowicz  
TU Delft, Faculty of mechanical, maritime and materials engineering, Netherlands

P 29. Do changes in movements after tool use depend on body schema or motor learning?  
Raoul M. Bongers  
Center for Human Movement Sciences, University of Groningen, Netherlands
P 30. A Motion-based Handheld Haptic Interface
Ki-Uk Kyung and Junsek Park
ETRI, South Korea

P 31. A Multi-Functional Rehabilitation Device to Assist Forearm/Wrist and Grasp Therapies
Ismail Hakan Ertas and Volkan Patoglu
Sabanci University, Turkey

P 32. Virtual surface discrimination via an anisotropic-stiffness contact model
Alessandro Formaglio, Gabriel Baud-Bovy, and Domenico Prattichizzo
Dipartimento di Ingegneria dell’Informazione, Università degli Studi di Siena, Italy; Vita-Salute San Raffaele University and IIT Research Unit of Molecular Neuroscience, San Raffaele Foundation, Italy; Italian Institute of Technology, Genova, Italy

P 33. A comparison of the haptic and visual horizontal-vertical illusion
Jacqui Howell, Mark Symmons, and Dianne Wuillemin
Monash University, Australia

P 34. Setting the Standards for Haptic and Tactile Interactions: ISO’s Work
Jan B.F. van Erp, Ki-Uk Kyung, Sebastian Kassner, Jim Carter, Stephen Brewster, Gerhard Weber, and Ian Andrew
TNO Human Factors, Netherlands; ETRI POST-PC Research Group, South Korea; Technische Universität Darmstadt, Germany; Computer Science Department, Un. of Saskatchewan, Canada; Glasgow Interactive Systems Group, Un. of Glasgow, United Kingdom; TU Dresden, Dept. Comp. Science, Germany; United Kingdom

P 35. Vibrotactor-belt on the Thigh – Directions in the Vertical Plane
Yael Salzer, Tal Oron-Gilad, and Adi Ronen
Ben Gurion University of the Negev, Israel

P 36. Accuracy of Haptic Object Matching in Blind And Sighted Children and Adults
Ans Withagen, Astrid M.L. Kappers, Mathijs P.J. Vervloed, Harry Knoors, and Ludo Verhoeven
Royal Visio, National foundation for the Visually Impaired and Blind, Netherlands; Helmholtz Institute, Universiteit Utrecht, Netherlands; Behavioural Science Institute, School of Educational Science, Radboud University Nijmegen, Netherlands; Royal Kentals, Netherlands

P 37. The Core Skills Trainer: A Set of Haptic Games for Practicing Key Clinical Skills
Sarah Baillie, Neil Forrest, and Tierney Kinnison
The Royal Veterinary College, United Kingdom

P 38. A measuring tool for accurate haptic modeling in industrial maintenance training
Paolo Tripicchio, Alessandro Filippeschi, Emanuele Ruffaldi, Franco Tecchia, Carlo Alberto Avizzano, and Massimo Bergamasco
Scuola Superiore S.Anna, Italy

P 39. Control Strategies and Performance of a Magnetically Actuated Tactile Micro-Actuator Array
Jérémie Streque, Abdelkrim Talbi, Philippe Pernod, and Vladimir Preobrazhensky
IEMN - UMR CNRS 8520, France

P 40. Muscular torque can explain biases in haptic length perception: a model study on the radial-tangential illusion
Nienke B. Debaets, Idsart Kingma, Peter J. Beek, and Jeroen B.J. Smeets
Research Institute MOVE, Faculty of Human Movement Sciences, VU University Amsterdam, Netherlands
Demos

The numbers correspond to the demo location (see plan on inside front cover).

D 1. Neuroaxial Anaesthesia Simulator
Dennis van Gerwen and John van den Dobbelsteen
Dept. BioMechanical Engineering, Delft University of Technology, Delft, The Netherlands
J.J.vandenDobbelsteen@tudelft.nl

D 2. Promoting Haptic Interaction Technology - SPIDAR-G & SPIDAR-mouse
Katsuhito Akahane, Takehiko Yamaguchi, Masaharu Isshiki, and Makoto Sato
Precision and Intelligence Laboratory, Tokyo Institute of Technology, Tokyo, Japan
{kakahane, m_isshiki}@hi.pi.titech.ac.jp, msato@pi.titech.ac.jp

D 3. The Cyclotactor
Staas de Jong
LIACS, Leiden University, Leiden, The Netherlands
staas@liacs.nl

D 4. Haptesha: A Collaborative Multi-User Haptic Workspace
Rene Weller and Gabriel Zachmann
Clausthal University, Germany
{rwe, zach}@tu-clausthal.de

D 5. Presentation of Positional Information by Heat Phantom Sensation
Jun Oohara
The University of Electro-Communications, Dept. of Human Communication, Tokyo, Japan
oohara@kaji-lab.jp

Manuel Ferre, Ignacio Galiana, Jorge Barrio, Pablo García-Robledo, and Raúl Wirz
Universidad Politécnica de Madrid, Madrid, Spain
ignaciogaliana@gmail.com, m.ferre@upm.es

D 7. VerroTouch: High-Frequency Acceleration Feedback for Telerobotic Surgery
Katherine J. Kuchenbecker, Jamie Gewirtz, William McMahan, Dorsey Standish, Paul Martin, Jonathan Bohren, Pierre J. Mendoza, and David I. Lee
University of Pennsylvania, Philadelphia, Pennsylvania, USA
kuchenbe@seas.upenn.edu

D 8. Reflective Haptics Pen
Götz Wintergerst and Ron Jagodzinski
HfG Schwäbisch Gmünd, TIR, hapTECH, Germany
wintergerst-g@hfg-gmuend.de

D 9. TexturePad: Realistic Rendering of Haptic Textures
Joseph Romano, Nils Landin, William McMahan, and Katherine J. Kuchenbecker
University of Pennsylvania, Philadelphia, Pennsylvania, USA
kuchenbe@seas.upenn.edu

D 10. A new robot for research on physical human-robot interaction
Bert Willaert, Brecht Corteville, Dominiek Reynaerts, Hendrik Van Brussel, and Emmanuel Vander Poorten
Department of Mechanical Engineering, division PMA, Leuven University, Heverlee, Belgium
bert.willaert@mech.kuleuven.be
D 11. A tactile jacket for unobtrusive emotion communication
Paul Lemmens, Joris Janssen, Kai Kuikkaniemi, and Gert-Jan de Vries
Philips Research, Eindhoven, The Netherlands; Eindhoven University of Technology, Eindhoven, The Netherlands; Helsinki Institute for Information Technology, Espoo, Finland
{paul.lemmens,gj.de.vries,joris.h.janssen}@philips.com, kai.kuikkaniemi@hiit.fi

D 12. Real-time Dual-band Haptic Music Player for Mobile Devices
Inwook Hwang, Moonchae Joung, Sunwook Kim, Kyeunghun Hwang, Jaecheon Sa, and Seungmoon Choi
Haptics and Virtual Reality Laboratory, Computer Science and Engineering, POSTECH, Republic of Korea; Digital Storage Research Laboratory, LG electronics, Republic of Korea
inux@postech.ac.kr, choism@postech.ac.kr

D 13. FlexTorque: Exoskeleton Haptic Interface for Haptic Interaction with the Digital World
Dzmitry Tsetserukou, Katsunari Sato, and Susumu Tachi
Toyohashi University of Technology, Aichi, Japan; University of Tokyo, Tokyo, Japan; Keio University, Yokohama, Japan
tsetserukou@gmail.com

D 14. Demo of working prototype of collaborative tool for visual and haptic perceptualization of liver surgery planning
Jonas Forsslund and Eva-Lotta Sällnäs
Human Computer Interaction Department, KTH Royal Institute of Technology, Stockholm, Sweden
jofo02@kth.se

D 15. EXOSTATION: Haptic Exoskeleton Based Control Station
Pierre Letier, Elvina Motard, and Jean-Philippe Verschueren
Space Applications Services N.V., Zaventem, Belgium
michel.ilzkovitz@spaceapplications.com

TNO booth Feel the music
Wouter Vos
TNO Human Factors, Soesterberg, The Netherlands
wouter.vos@tno.nl

12.30–13.30 Lunch
Lunch will be served in the Restaurant (see plan on inside front cover how to get there).

13.30–15.00 Oral session 6: Virtual Reality

Chairs: Dong-Soo Kwon and Katherine Kuchenbecker

Design and Development of a Haptic Dental Training System - hapTEL
Brian Tse, William Harwin, Alastair Barrow, Barry Quinn, Jonathan San Diego, and Margaret Cox
The University Of Reading, United Kingdom; Kings College London, United Kingdom

Design of a multimodal VR platform for the training of surgery skills
Florian Gosselin, Fabien Ferlay, Sylvain Bouchigny, Christine Mégard, and Farid Taha
CEA-LIST, France; CHU Amiens, France
Keynote: Rosalyn Driscoll: Playing with Fire

Abstract Exploring hapticity, whether scientifically or artistically, is to engage with one of the fundamental elements of life. Touch, by its very nature and structure, connects us to our inner dimensions where memory, imagination and the unconscious dwell; it produces sensations, which have an unsettled relationship to feelings; and it shapes our identity and sense of self. These themes will be illustrated with artwork and poems.

More information about Driscoll’s work may be found on her website:
www.rosalyndriscoll.com

Conference dinner

Please check at the registration desk whether tickets for the conference dinner are still available, if you did not order tickets in advance. The conference dinner will take place aboard the ship “BOOT”, which will sail through the Amsterdam harbour. The vessel is open from 19.00 hrs. and will sail at 19.30 at the latest, so make sure to be aboard by then. Landlubbers will be keelhauled. Arrr! The location is:
De Ruyterkade, pier 14; north-east side of Central Train Station, next to the ferries moored there (see location B on map 1 on page 26).

You can use metro line 51 to get from the VU university to the central station, which will take about 20 minutes. Metro trains leave every 10 minutes from the “De Boelelaan/VU” station. The ship will return around 22.30 hrs.
SensAble Technologies
Leaders in Haptic Devices & Toolkits

PHANTOM® Haptic Devices & Software Toolkits

SensAble Technologies:
- 18 years of experience in haptics
- 41+ technology patents awarded
- 9 systems to choose from
- Variety of end effectors
- OpenHaptics Developers Kit and QuickHaptics API make programming simple
- Over 8,000 systems installed worldwide in hundreds of applications.

PHANTOM® Haptic Devices used for:
- Medical simulation and training
- 3D modeling input for medical, dental and product design
- Test and measurement
- Molecular modeling
- Collision detection
- Stroke rehabilitation
- Telemedicine
- Robotic assembly & assembly path planning
- Virtual reality applications
- Training for visually impaired
- Human/Computer interface research
- Many more applications!


advertisement
Saturday

9.00–9.30  
**EuroHaptics Society business meeting**

The meeting will be held in the auditorium.

9.30–10.30  
**Oral session 7: Surfaces**

*Chairs:* Angelika Peer and Gunnar Jansson

- **Power consumption reduction of a controlled friction Tactile Plate**  
  Frédéric Giraud, Michel Amberg, Romuald Vaubelleghem, and Betty Lemaire-Semail  
  *Université Lille1, France; INRIA Lille Nord Europe, France*

- **Psychophysical Evaluation of a Low Density and Portable Tactile Device Displaying Small-scale Surface Features**  
  Nadia Vanessa Garcia-Hernandez, Nikos Tsagarakis, Ioannis Sarakoglou, and Darwin Caldwell  
  *Italian Institute of Technology, Italy*

- **Tactile Perception of a Water Surface – Contributions of Surface Tension and Skin Hair**  
  Michi Sato, Junya Miyake, Yuki Hashimoto, and Hiroyuki Kajimoto  
  *The University of Electro-Communications, Japan*

- **A Force and Touch Sensitive Self-Deformable Haptic Strip for Exploration and Deformation of Digital Surfaces**  
  Monica Bordegoni, Umberto Cugini, Mario Covarrubias, and Michele Antolini  
  *Politecnico di Milano, Italy*

10.30–12.30  
15.00–16.45  
**Poster and demo session 2**

**Posters**

The numbers correspond to the poster location (see plan on inside front cover). Presenters of odd-numbered posters will be at their poster during the morning session. Presenters of even-numbered posters will be at their posters during the afternoon session.

- **P 1. Creating Virtual Stiffness by Modifying Force Profile of Base Object**  
  Atsutoshi Ikeda, Yuichi Kurita, Takeshi Tamaki, Kazuyuki Nagata, and Tsukasa Ogasawara  
  *Nara Institute of Science and Technology, Japan; National Institute of Advanced Industrial Science and Technology, Japan*

- **P 2. Extended Rate-Hardness: A Measure for Perceived Hardness**  
  Gabjong Han and Seungmoon Choi  
  *Department of Computer Science and Engineering, Pohang University of Science and Technology (POSTECH), South Korea*

- **P 3. Using a fingertip tactile device to substitute kinesthetic feedback in haptic interaction**  
  Domenico Prattichizzo, Claudio Pacchierotti, Stefano Cenci, Konta Minamizawa, and Giulio Rosati  
  *Italian Institute of Technology, Genova, Italy; Dipartimento di Ingegneria dell’Informazione, University of Siena, Italy; Dept. of Innovation in Mechanics and Management, University of Padua, Italy; University of Tokio, Japan*
P 4. The Effect of Bimanual Lifting on Grip Force and Weight Perception
Christos Giachritsis and Alan Wing
*University of Birmingham, United Kingdom*

P 5. How to Build an Inexpensive 5-DOF Haptic Device using Two Novint Falcons
Aman V. Shah, Scott Teuscher, Eric W. McClain, and Jake J. Abbott
*University of Utah, United States*

P 6. Revisiting the Effect of Velocity on Human Force Control
Manikantan Nambi, William R. Provancher, and Jake J. Abbott
*University of Utah, United States*

P 7. Mechanical impedance: A cobotic and haptic actuators performance criterion
Jonathan Van Rhijn, Alain Riwan, Ziad Jabbour, and Vigen Arakelyan
*CEA LIST, France; DGMA INSA Rennes, France*

P 8. Evaluation of a Coordinating Controller for Improved Task Performance in Multi-User Teleoperation
Thomas Schauß, Raphaëla Groten, Angelika Peer, and Martin Buss
*Institute of Automatic Control Engineering, Technische Universität München, Germany*

P 9. Effects of Force Feedback and Arm Compliance on Teleoperation for a Hygiene Task
Chih-Hung A. King, Marc D. Killpack, and Charlie C. Kemp
*Georgia Institute of Technology, United States*

P 10. Telepresence Technology for Production: From Manual to Automated Assembly
Marwan Radi, Andrea Reiter, Michael Zäh, Thomas Müller, and Alois Knoll
*Technische Universität München, Germany*

P 11. High Fidelity Haptic Rendering for Deformable Objects Undergoing Topology Changes
Hoeryong Jung, Stephane Cotin, Christian Duriez, Jeremie Allard, and Doo Yong Lee
*KAIST, South Korea; INRIA, France*

P 12. Tremor Suppression Control for a Meal-Assist Robot
Ken’ichi Yano, Kenji Nishiwaki, and Shota Hiramatsu
*Gifu University, Japan*

P 13. Reflective Haptics: Enhancing Stylus-Based Interactions on Touch Screens
Götz Wintergerst, Ron Jagodzinski, Fabian Hemmert, Alexander Müller, and Gesche Joost
*HfG Schwaebisch Gmuend, Germany; Deutsche Telekom Laboratories, Germany*

P 14. A novel tactile sensor for detecting lumps in breast tissue
Mehmet Ayyildiz, Burak Guclu, Mustafa Z. Yildiz, and Cagatay Basdogan
*Koc University, Turkey; Bogazici University, Turkey*

P 15. Tactile Sensation Imaging for Artificial Palpation
Jong-Ha Lee, Chang-Hee Won, Kaiguo Yan, Yan Yu, and Lydia Liao
*Temple University, United States; Thomas Jefferson University Hospital, United States; Cooper University Hospital, United States*

P 16. Improving Vehicular Window Control with Haptic and Visual Feedback
David Racine, John Holmen, Mehrdad Hosseini Zadeh, and Mark Thompson
*Kettering University, United States*

P 17. Gesture Recognition in the Haptic Creature
Jonathan Chang, Karon MacLean, and Steve Yohanan
*University of British Columbia, Canada*
P 18. Analysis of a New Haptic Display Coupling Tactile and Kinesthetic Feedback to Render Texture and Shape
   Tao Zeng, Frédéric Giraud, Betty Lemaire-Semail, and Michel Amberg
   USTL, L2ep-IRCICA, France; Université Lille Nord de France

P 19. Constraints on Haptic Short-Term Memory
   Catherine Monnier and Delphine Picard
   Université Montpellier 3, France; Université Toulouse II Institut Universitaire de France, France

   Zheng Wang, Ji Lu, Angelika Peer, and Martin Buss
   Technische Universität München, Germany

   Eva-Lotta Sallnäs
   Royal Institute of Technology MDI group, Sweden

P 22. Haptic/VR Assessment Tool for Fine Motor Control
   Christophe Emery, Evren Samur, Olivier Lambercy, Hannes Bleuler, and Roger Gassert
   ETHZ, Switzerland; EPFL, Switzerland

P 23. Hand and Arm Ownership Illusion through Virtual Reality Physical Interaction and Vibrotactile Stimulations
   Miguel Angel Padilla-Castaneda, Silvia Pabon, Antonio Frisoli, Edoardo Sotgnì, Claudio Loconoële, and Massimo Bergamasco
   PERCRO Lab., Scuola Superiore Sant’Anna, Italy

P 24. Embedding Tactile Feedback into Handheld Devices: An Aperture-Based Restraint for the Finger or Thumb
   Brian T. Gleeson and William R. Provancher
   University of Utah, United States

P 25. Understanding the Haptic Experience through Bodily Engagement with Sculptural Ceramics
   Bonnie Kemske
   Museum of Archaeology and Anthropology, Cambridge University, United Kingdom

P 26. Development of Haptic Microgripper for Microassembly Operation
   Shahzad Khan, Ton de Boer, Pablo Estevez, Hans H. Langen, and Rob H. Munnig Schmidt
   TU Delft, Netherlands

P 27. A haptic gearshift interface for cars
   Eloisa García-Canseco, Alain Ayemlong-Fokem, Alex Serrarens, and Maarten Steinbuch
   Eindhoven University of Technology, Netherlands; Drivetrain Innovations, Netherlands

P 28. Proprioceptive acuity varies with task, hand target, and when memory is used
   Stephanie A.H. Jones, Katja Fiehler, and Denise Y.P. Henriques
   York University, Canada

P 29. Size-Change Detection Thresholds of a Hand-Held Bar at Rest and during Movement
   Gabriel Baud-Bovy, Valentina Squeri, and Vittorio Sanguineti
   Vita-salute San Raffaele University & IIT Network Research Unit of Molecular Neuroscience, San Raffaele Foundation, Milan, Italy; Italian Institute of Technology, Genova, Italy; University of Genova, Italy
P 30. Haptic feedback of piconewton interactions with optical tweezers
Cécile Pacoret, Arvid Bergander, and Stéphane Régnier
CNRS UMR, France; CEA LIST, France

P 31. Pressure is a Viable Controlled Output of Motor Programming for Object Manipulation Tasks
Camille Williams, Daniel Shang, and Heather Carnahan
Institute of Biomaterials & Biomedical Engineering, University of Toronto, Canada; Department of Kinesiology, University of Waterloo, Canada; Department of Occupational Science and Occupational Therapy, University of Toronto, Canada

P 32. The Effect of Coulomb Friction in a Haptic Interface on Positioning Performance
Koen Crommentuijn and Dik J. Hermes
Eindhoven University of Technology, Netherlands

P 33. Is the touch-induced illusory flash distinguishable from a real flash?
Tom G. Philippi, Jan B.F. van Erp, and Peter J. Werkhoven
TNO Human Factors, Netherlands; Department of Information and Computing Sciences, Utrecht University, Netherlands

P 34. Haptic Recognition of Non-figurative Tactile Pictures in the Blind: Does Lifetime Proportion without Visual Experience Matter?
Samuel Lebaz, Delphine Picard, and Christophe Jouffrais
University of Toulouse II, EA4156 Octogone-ECCD, France; IRIT, CNRS & Univ. Toulouse, France

P 35. Preliminary Evaluation of a Haptic Aiding Concept for Remotely Piloted Vehicles
Samantha M.C. Alaimo, Lorenzo Pollini, Alfredo Magazzù, Jean Pierre Bresciani, Paolo Robuffo Giordano, Mario Innocenti, and Heinrich H. Bülthoff
Max Planck Institute for Biological Cybernetics Tübingen, Germany; Dept. Electrical Systems and Automation, University of Pisa, Italy; Cantieri Magazzù, Italy

P 36. Haptic Adjustment of Cylinder Radius
Astrid M.L. Kappers
Helmholtz Institute, Universiteit Utrecht, Netherlands

P 37. The effects of 3D collocated presentation of visuo-haptic information on performance in a complex realistic visuo-motor task
Dror David Lev, Roman Rozengurt, Tami Gelfeld, Alex Tarchenshvili, and Miriam Reiner
Technion-Israel Institute of Technology, Israel

P 38. Visuo-haptic length judgments in children and adults
Knut Drewing and Bianca Jovanovic
Abteilung Allgemeine Psychologie, Justus-Liebig-Universität Gießen, Germany

P 39. Presentation of Positional Information by Heat Phantom Sensation
Jun Oohara, Hiroshi Kato, Yuki Hashimoto, and Hiroyuki Kajimoto
University of Electro-Communications, Japan; University of Electro-Communications, Japan Science and Technology Agency, Japan

P 40. Haptic Playback: Better Trajectory Tracking During Training Does Not Mean More Effective Motor Skill Transfer
Maxim Kolesnikov and Miloš Žefran
Rehabilitation Institute of Chicago, United States; University of Illinois at Chicago, United States
Demos

The numbers correspond to the demo location (see plan on inside front cover).

D 1. HugMe: Synchronous Haptic Teleconferencing
Jongeun Cha, Mohamad Eid, Ahmad Barghout, and Abdulmotaleb El Saddik
School of Information Technology and Engineering, University of Ottawa, Ottawa, Canada
jcha@discover.uottawa.ca, {eid,abarghout,kafi,abed}@mcrlab.uottawa.ca

D 2. Haptic gas pedal capable of recording proprioceptive feedback parameters
David Abbink and Frans van der Helm
Delft University of Technology, Delft, The Netherlands
F.C.T.vanderHelm@tudelft.nl

D 3. New design of a touchpad device with tactile feedback
Romuald Vanbelleghem, Frédéric Giraud, Michel Amberg, and Betty Lemaire-Semail
INRIA Futur, Villeneuve d’Ascq cédex, France; L2EP / IRCICA, Villeneuve d’Ascq cédex, France
romuald.vanbelleghem@inria.fr, {frederic.giraud, betty.semail}@polytech-lille.fr, michel.amberg@univ-lille1.fr

D 4. Inversion of causality in the reproduction of roughness
Michael Wiertlewski, José Lozada, Edwidge Pissaloux, and Vincent Hayward
CEA List Sensory and Ambient Interfaces Laboratory, Fontenay Aux Roses, France; University Paris 6 UPMC, Paris, France
m.wiertlewski@gmail.com

D 5. Electro-tactile Display with Real-time Feedback
Hiroyuki Kajimoto
The University of Electro-Communications, Dept. of Human Communication, Tokyo, Japan
kajimoto@hc.uec.ac.jp

D 6. The Core Skills Trainer
Sarah Baillie, Neil Forrest, and Tierney Kinnison
The Royal Veterinary College, University of London, London, UK
{gbaillie, ndforrest, tkinnison}@rvc.ac.uk

D 7. Basic Properties of Phantom Sensation for Practical Haptic Applications
Hiroshi Kato
The University of Electro-Communications, Dept. of Human Communication, Tokyo, Japan
hiro.kato@hc.uec.ac.jp

D 8. Transmission system for spatially distributed tactile information
Katsunari Sato and Susumu Tachi
Graduate School of Information Science and Technology, University of Tokyo, Tokyo, Japan; Graduate School of Media Design, Keio University, Yokohama, Japan
{sato, tachi}@tachilab.org

D 9. A tangible image: a Media with Haptic Information
Seung-Chan Kim, Ki-Uk Kyung, Byung-Kil Han, and Dong-So Kwon
Tele robotics and Control Laboratory, KAIST, Korea; POST-PC Research Group, ETRI, Korea
{kims, hanbk}@robot.kaist.ac.kr, kyungku@etri.re.kr, kwonds@kaist.ac.kr
D 10. Three tactile information displays
Quentin King
qk@idx.com.au

Dzmitry Tsetserukou and Alena Neviarouskaya
Toyohashi University of Technology, Aichi, Japan; University of Tokyo, Tokyo, Japan
tsetserukou@gmail.com, lena@mi.ci.i.u-tokyo.ac.jp

D 12. Tactile works of art
Bonnie Kemske
Orchard Studio, Cambridge, UK
mail@bonniekemske.com

D 13. A Motion-based Handheld Haptic Interface
Ki-Uk Kyung and Junseok Park
POST-PC Research Group, ETRI, Korea
kyungku@gmail.com

Sara Comai and Davide Mazza
Politecnico di Milano, Department of Electronics and Information, Milan, Italy
{fsara.comai,davide.mazzag}@polimi.it

D 15. Haptic perception of rod length by holding and wielding
Nienke B. Debats, Peter J. Beek, Jeroen B.J. Smeets, and Idsart Kingma
Research Institute MOVE, Faculty of Human Movement Sciences, VU University Amsterdam, the Netherlands
N.Debats@fbw.vu.nl

TNO booth Feel the music
Wouter Vos
TNO Human Factors, Soesterberg, The Netherlands
wouter.vos@tno.nl

12.30–13.30 Lunch
Lunch will be served in the Restaurant (see plan on inside front cover how to get there).

13.30–15.00 Oral session 8: Grasping and moving

Chairs: Manuel Ferre and Alan Wing

Animating a synergy-based deformable hand avatar for haptic grasping
Sara Mulatto, Alessandro Formaglio, Monica Malvezzi, and Domenico Prattichizzo
Dipartimento di Ingegneria dell’Informazione, Università degli Studi di Siena, Italy; Italian Institute of Technology, Genova, Italy

Development of a 3 DoF MR-Compatible Haptic Interface for Pointing and Reaching Movements
Stefan Klare, Angelika Peer, and Martin Buss
Technische Universität München, Lehrstuhl für Steuerungs- und Regelungstechnik, Germany
Cold objects pop out!

Myrthe A. Plaisier and Astrid M.L. Kappers
Helmholtz Institute, Universiteit Utrecht, Netherlands

Using Haptic-based Trajectory Following in 3D Space to Distinguish Between Men and Women
Eleni Zarogianni, Ioannis Marras, and Nikos Nikolaidis
Department of Informatics, Aristotle University of Thessaloniki, Greece

Hand-Held Object Force Direction Identification Thresholds at Rest and during Movement
Gabriel Baud-Bovy and Elia Gatti
IIT Network Research Unit of Molecular Neuroscience, San Raffaele Foundation, Milan, Italy; Vita-Salute San Raffaele University, Milan, Italy

A New Planar 4-DOF Spring and Cable Driven Force Feedback Device
Yi Yang, Yuru Zhang, and Betty Lemaire-Semail
State Key Laboratory of Virtual Reality Technology and Systems, Beihang University, China; L2EP-IRCICA, Université Lille 1, France

16.45–17.45

Keynote: Marc Ernst: Teaching perception

Abstract  Humans, as well as animals, use all their senses to construct a reliable and accurate percept representing the world with which they interact. The view we take in my research group is that in many aspects of behaviour, motor actions and multisensory processing are inseparably linked and therefore have to be studied in a closed action/perception loop. We believe that human perception and action is tailored to the statistics of the natural environment and when the environment changes our perceptions will follow these changes through the process of adaptation, minimizing potential costs during interaction. In the neural processing such statistics will represent itself in probability distributions. We follow Hermann von Helmholtz in our belief that human perception is a problem of inference, for which the sensory data are often not sufficient to uniquely determine the percept. Thus, prior knowledge has to be used to constrain the process of inference from ambiguous sensory signals. A principled way to describe the combination of prior knowledge with sensory data in a probabilistic way is the Bayesian Framework. Therefore, we regularly use this Bayesian Framework to construct “ideal observer” models—computational models that use the available information in the most optimal way, provided some task and cost function. These models can then be implemented on robotic platforms and can be used as a benchmark against which human performance will be tested. To do so, in my group we use quantitative psychophysical, computational and neuropsychological methods together with Virtual Reality techniques. Quantitative psychophysical methods are important to best determine the relevant perceptual parameters minimizing uncertainty and unknowns that are needed for the computational modelling of human sensorimotor behaviour. Virtual Reality is important because it provides us with a tool to precisely control the perceptual situation that are investigated, while at the same time it allows for a degree of interaction, which is necessary for studying the action/perception loop. Often, however, today’s Virtual Reality techniques and Human-Computer Interaction devices are not sufficiently developed to be readily used in the study of human perception and action. Therefore, some of our recent work also concentrates on the development of human-machine interfaces. This is mostly done in the framework of European projects. For example, the European Projects Touch-Hapsys, ImmerSence and THE all focus on the development of haptic interaction devices. In contrast, the European project CyberWalk had the goal to develop an omnidirectional treadmill for enabling near-natural locomotion in Virtual Reality.

23
Reality. To achieve these goals we are working closely together in an international team of psychologists, engineers, and computer scientists.

17.45–18.00 Announcement of future EuroHaptics and WorldHaptics conferences

18.00–18.15 Awards ceremony

Prizes of €500 will be awarded to the Best Paper, sponsored by Force Dimension; the Best Oral Presentation, sponsored by SensAble Technologies; the Best Poster Presentation, sponsored by Noldus Information Technology; and the Best Demo, sponsored by Moog.

18.15–18.30 Closing

Organisation

This conference was organised by
Jan van Erp (chair), TNO Human Factors, Soesterberg, Netherlands
Jeroen Smeets, VU University, Amsterdam, Netherlands
Astrid Kappers, Utrecht University, Utrecht, Netherlands
Frans van der Helm, Delft University of Technology, Delft, Netherlands
Peter Werkhoven, Utrecht University, Utrecht, Netherlands
Wouter Bergmann Tiest, Utrecht University, Utrecht, Netherlands
Anne-Marie Brouwer, TNO Human Factors, Soesterberg, Netherlands
Tom Philippi, Utrecht University, Utrecht, Netherlands

Proceedings

The proceedings of this conference have been published as

Important telephone numbers

<table>
<thead>
<tr>
<th>Service</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emergency Services</td>
<td>112</td>
</tr>
<tr>
<td>Registration Desk</td>
<td>+31 20 5985793 (Wed and Thu only)</td>
</tr>
<tr>
<td>Taxi Services</td>
<td>+31 20 7777777 (TCA)</td>
</tr>
<tr>
<td></td>
<td>+31 20 6333333 (Taxi Direct)</td>
</tr>
<tr>
<td>Tourist Office</td>
<td>+31 20 2018800</td>
</tr>
<tr>
<td></td>
<td>(see also <a href="http://www.iamsterdam.com">www.iamsterdam.com</a>)</td>
</tr>
</tbody>
</table>
THE MOTION CONTROL EXPERTS AT MOOG CAN HELP YOU SIMULATE REALITY

High performance haptic solutions to solve real-world problems

At any given moment, in training centers around the world, a Moog simulation solution is at work providing an unsurpassed level of performance, fidelity and reliability.

Haptics is the science of creating a realistic sense of touch in a virtual environment. For decades, Moog has been creating solutions in flight simulation that effectively apply this technology.

The boundaries of haptics are continuously expanding and reaching new application domains.

- Haptic research
- 3D prototype evaluation
- Rehabilitation of stroke patients
- Simulation and training in difficult conditions

To learn more, please e-mail: haptics@moog.com

WHAT MOVES YOUR WORLD

www.moog.com/products/haptics-robotics
Hidden Hotspots of Amsterdam

Presented by the EuroHaptics Special Symposium

Hidden Histories of Haptics

These hotspots are a selection of places which you may not find (or overlook) in the tourist guides, although I could not resist including some usual suspects. It is completely incomplete but so is your time. The restriction I used in the selection was that the hotspots are located near a public transport route to the EuroHaptics conference site.

Hope you enjoy Amsterdam,
Maarten

A: Muziekgebouw/bimhuis
Piet Heinkade 1, www.muziekgebouw.nl and www.bimhuis.nl
A truly great building with a magnificent cafe on the waterside of the IJ. You’ll see the best sunset of Amsterdam. Furthermore, the “Muziekgebouw” is the place to be for contemporary classical music, the acoustics are great. The “Bimhuis” is located inside the building and hosts the best jazz concerts you’ll find in the Netherlands. The background of the podium is a big glass wall through which you can overlook Amsterdam during the concerts (if they don’t close the curtains).

B: Ferry to NDSM
Free boat tour to the North side of Amsterdam. You are very lucky since at the other side is a very cool festival (www.overhetij.nl) going on during the conference. It is an old industrial site (a dock) and definitely worth visiting and see the other side of Amsterdam.

C: Public library
Oosterdokskade 143, www.oba.nl
New library building which everyone in Amsterdam loves.
**2**

**A: W139 & Winston Kingdom**
Warmoesstraat 131, www.winston.nl
Every night bands and party, for the young ones!

**B: Cafe van Zuylen**
Torensteeg 8
Best place to have an outdoor drink at a canal side.

**C: Netherlands Media Art Institute**
Keizersgracht 264, http://www.nimk.nl/ (admission 4.50 euro)
Contemporary video art

**D: Nieuwmarkt**
At the border of the Red Light District, this place is filled with fine eateries (have a famous Cheese fondue at Bern) and cafes. Also check out the Zeedijk.

---

**3**

**A: Oudemanhuispoort**
Small alley that hosts second hand book stands.

**B: Kromboomsloot**
One of my favorite canals, although nothing happens there. Maybe that’s why it is my favorite.

**C: Huis Marseille**
Keizersgracht 401
Contemporary photo gallery (admission 5 euro)

**D: Cafe De Jaren**
Nieuwe Doelenstraat 20
Also a very nice place to have a drink at the waterside.

**E: Waterlooplein**
Market for second hand clothing and other stuff.

**F: Cafe De Sluyswacht**
Jodenbreestraat 1
Nice cafe at the waterside

**G: Hermitage**
Nieuwe Herengracht 14, www.hermitage.nl
A guy from Amsterdam persuaded the Hermitage to have a dependance at the Amstel. Great stuff, although it depends a bit on the current exhibition.

**H: Spui**
Bookshops and cafes all located within a few feet.
A: Concerto
Utrechtsestraat 60
Best cd shop in Amsterdam

B: Stadsschouwburg + Last Minute Ticket Shop
The city theatre hosts the best plays in the city and in the Last Minute Ticket shop you can buy tickets for many theaters for half the price.

C: Weber/Lux
Marnixstraat 397/403
Cafés for late night drinks. Favorite place for Amsterdam pop musicians (although not in the weekends).

D: Snoeshaan
Leidsekade 90
Favorite place for actors to have a drink after work.

E: Melkweg
Lijnbaansgracht 234-A, www.melkweg.nl
Pop concert venue.

F: Eylders
Karte Leidsedwarsstraat 47
Great old café with a very dirty place in which you can smoke your cigarettes, if you like...

H: Paradiso
Weteringschans 6, www.paradiso.nl
Old church and now a pop temple. Best place for some dance moves, if they have something on schedule.

I: Rijksmuseum
Stadhouderskade 42, www.rijksmuseum.nl
Still under construction, but a small part is open for the public.

J: PC Hooftstraat
The expensive-shops-street of Amsterdam. If you like it.

A: Filmmuseum + Vertigo
Vondelpark 3, www.filmuseum.nl
Watch old movies in an old theatre and afterwards sit under the big trees in the park for dinner or only a drink.

B: Blauwe Theehuis
Best place for drinks in the Vondelpark.

C: Van Eeghenstraat
Nice street to wander a bit, nice but rather expensive houses for the people who decide not to go into science.

D: Concertgebouw
Concertgebouwplein 2-6, www.concertgebouw.nl
The famous Amsterdam Concert hall. A bit expensive, so check out the last minute ticket shop!

E: Zuiderbad
Hobbemastraat 26, http://www.zuiderbad.amsterdam.nl/vrije_tijd_en_sport/zuiderbad
Have a swim for a few euros.

F: Marie Heinekenplein + De Appel + De Pijp
In this area you may find less tourists and more nice places to eat. The Amsterdam Yuppies occupy this area. De Appel is a contemporary art gallery.

G: Museumplein: van Gogh
The only big museum that is not (partly) closed!
To display the digital world to your hands | to invent new ways to interact with computers and machines | we manufacture and market the finest precision master haptic devices for leading-edge applications in research, medical and industry.

Force Dimension
Switzerland

www.forcedimension.com
info@forcedimension.com

Robotic surgery combines the expertise of surgeons with the precision of robots. Yet for man and machine to seamlessly work together, new interfaces are required that make the robot a natural extension of the surgeon’s skills. The MiroSurge robotic surgical system achieves this goal by using a dual omega.7 haptic interface as both input device and force display.
<table>
<thead>
<tr>
<th>Time</th>
<th>Wednesday July 7th</th>
<th>Thursday July 8th</th>
<th>Friday July 9th</th>
<th>Saturday July 10th</th>
</tr>
</thead>
<tbody>
<tr>
<td>8:30</td>
<td>Registration Open</td>
<td>Registration Open</td>
<td>Registration Open</td>
<td></td>
</tr>
<tr>
<td>8:45</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9:00</td>
<td>Workshops 1, 2, and 3</td>
<td>Conference Opening</td>
<td>Session 5: Texture</td>
<td>EHS Business meeting</td>
</tr>
<tr>
<td>9:15</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9:30</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9:45</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10:00</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10:15</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10:30</td>
<td>Break</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10:45</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11:00</td>
<td>Session 2: Teleoperation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11:15</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11:30</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11:45</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12:00</td>
<td>Lunch</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12:15</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12:30</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12:45</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13:00</td>
<td>Lunch</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13:15</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13:30</td>
<td>Session 3: Novel Approaches</td>
<td>Session 6: Virtual Reality</td>
<td>Session 8: Grasping and Movement</td>
<td></td>
</tr>
<tr>
<td>13:45</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14:00</td>
<td>Workshops 2, 4, 5, 6, and 7</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14:15</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14:30</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14:45</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15:00</td>
<td>Break</td>
<td>Poster/Demo 1a</td>
<td>Poster/Demo 2a</td>
<td></td>
</tr>
<tr>
<td>15:15</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15:30</td>
<td>Session 4: Force and Torque</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15:45</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16:00</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16:15</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16:30</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16:45</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17:00</td>
<td>Keynote: Patrick van der Smagt: From grasping to manipulation</td>
<td>Keynote: Rosalyn Driscoll: Playing with Fire</td>
<td>Keynote: Marc Ernst: Teaching perception</td>
<td>Announcements</td>
</tr>
<tr>
<td>17:15</td>
<td></td>
<td></td>
<td></td>
<td>Award Ceremony</td>
</tr>
<tr>
<td>17:30</td>
<td></td>
<td></td>
<td></td>
<td>Closing</td>
</tr>
<tr>
<td>17:45</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18:00</td>
<td>Opening Drinks</td>
<td></td>
<td>Conference Dinner</td>
<td></td>
</tr>
<tr>
<td>18:15</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18:30</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18:45</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>19:00</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>19:15</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>19:30</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>19:45</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20:00</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>23:00</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>