THE 7TH INTERNATIONAL CONFERENCE ON TANGIBLE, EMBEDDED AND EMBODIED INTERACTION
ORGANIZERS:

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Tangible Display

SUPPORTED BY:

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Welcome

TEI is already in its seventh edition. This conference now counts with a solid and mature community, which is nonetheless growing every year. We are very happy to host this conference in Barcelona with one of the highest registrations ever, proving the high acceptance of the conference and its scientific value. We are also very happy to do it from Universitat Pompeu Fabra (UPF), the youngest university in Barcelona - counting only 20 years of life. We are proud to host TEI’13 from this small university (~13,000 undergraduate and graduate students), which is nonetheless (according to a recent official study by U. of Granada and U. of Zaragoza), the first university in Spain in percentage of scientific production per researcher.

Barcelona hosts this conference setting a rich backdrop of design activity. The diversity and characteristic qualities of the architecture of Barcelona are its most well known design face. However, there is more in Modernist architecture than only Gaudi’s famous works and there is more to Barcelona’s architecture than Modernism. In this sense you will be able to directly experience the architecture of international architects that have left their footprint in Barcelona, such as Jean Nouvel with his rounded and illuminated skyscraper. You will also experience the architecture of contemporary Catalan architects such as Oriol Bohigas whose MBM studio designed and built the Design Hub, the magnificent new design center that will serve as TEI’13’s venue even before its official opening! But Barcelona has many other design faces. One that has grown incredibly in the last fifteen years is that of cuisine with world famous chefs, such as Ferran Adrià, and many excellent restaurants boasting several Michelin stars. Graphic design, furniture design, urban design, etc., are all attracting the interest of the design community worldwide. If multidisciplinarity and creativity is thus strongly associated with Barcelona, it is also an important trademark of Universitat Pompeu Fabra, and especially of its Department of Information and Communication Technologies (DTIC) that host this year’s conference. With internationally acclaimed research groups on Music, Interactive or Cognitive Media Technologies, with Master and Phd programs on Sound and Music Computing, Cognitive Systems and Interactive Media, or Media Arts, from our own research in which we also try to contribute to Barcelona’s design faces through Interaction Design, DTIC seems a natural place for hosting the multiple points of view and perspectives associated with TEI.
For these reasons, apart from the papers sessions and the demos that constitute the backbone of any academic conference, we have kept pushing other tracks that have already become TEI’s hallmarks, such as the Studios, the Design Challenge, the Arts Exhibition and the Graduate Student Consortium, the last generously funded by the US National Science Foundation (NSF). We have also expanded the musical track successfully started in the last TEI’12 edition at Kingston, by organizing a full concert on “Tangible Music” that will take place in Razzmatazz, one of Barcelona’s more emblematic clubs. Tangible Music will also be the main topic of our first keynote talk, which will be given hand by hand by Frederic Bevilacqua and Norbert Schnell from Ircam, whereas our closing keynote, Bill Verplank, who is also our Design Challenge chair, will talk about Metaphors, Haptics and Celebration. Finally, Caroline Hummels and Brygg Ullmer have coordinated an exciting panel on “the beauty of the paradigms” that addresses the seemingly infrequently discussed topic of how to reconcile the disparate conceptual paradigms and core values that make up TEI.

In an attempt at showcasing this Barcelonian polyhedral design and creative effervescence, we have also collaborated with other centers and entities, such as Fab Lab Barcelona, which is part of the international network of digital fabrication laboratories and which will host the Studios, or the Phonos Foundation which promotes social and cultural projects to foster the creation and diffusion of music with technological means, and which is coordinating the concert and the Design Challenge. Therefore, TEI’13 is more than “one more conference in Barcelona”: It is an opportunity to have experts from around the world presenting and discussing the latest advances in Tangible, Embedded and Embodied Interaction from all possible perspectives, combining academic soundness with more experimental and hands-on approaches, bringing together academics, artists, designers, inventors, thinkers or musicians.

And the city council has understood this well through the ICUB (the culture department) who has kindly provided funding for the main award of this year’s TEI’13 Design Challenge. Luckily the list of TEI’13 sponsors does not end here. We owe a great debt to many institutional and corporate supporters: the Spanish Ministerio de Economía y Competitividad, the Catalan Departament d’Economia i Coneixement, the Music Technology Group at Universitat Pompeu Fabra, Microsoft Research, Seed Studio, Reactable Systems, ICubeX and Tangible Displays. Their partnership and support have been essential.

We would finally like to thank the many people that have contributed with their valuable time to make TEI’13 possible. We start with our Program Chairs, Martin Kaltenbrunner, Dave Kirk and Paul Marshall, who have worked in strong collaboration with 46 program committee members and 232 reviewers, to ensure that the papers and demos selected represent the greatest diversity and adhere to the highest standards. Ten more co-chairs have taken exceptional care of the Arts Track, the Design Challenge, the Graduate Student Consortium, the Demos and the Studios, and fifteen students volunteers ensure that everything in the conference runs smoothly.

The staff at DHUB has strongly contributed at conditioning a spectacular venue that has not yet been officially inaugurated. We also thank sincerely the TEI steering committee, the staff at the ACM, and all the authors who have contributed with their works, for continuing to place TEI where it merits. Finally, very special thanks go for Alba Rosado and Sebastian Mealla, from the Music Technology Group at UPF, who have multitasked transversally and tirelessly for months, taking care of every possible detail. Without any of them this TEI’13 would not have happened.

Enjoy the conference!

Sergi Jordà
TEI’13 CONFERENCE CO-CHAIR
Music Technology Group
Universitat Pompeu Fabra
Barcelona, Spain

Narcis Parés
TEI’13 CONFERENCE CO-CHAIR
Cognitive Media Technologies Group
Universitat Pompeu Fabra
Barcelona, Spain
## Committee

### TEI 2013 COMMITTEE

#### Conference co-chairs
- Sergi Jordà
  - UNIVERSITAT POMPEU FABRA, SPAIN
- Narcís Parès
  - UNIVERSITAT POMPEU FABRA, SPAIN

#### Program chairs
- Martin Kaltenbrunner
  - UNIVERSITY OF ART AND DESIGN LINZ, AUSTRIA
- Dave Kirk
  - NEWCASTLE UNIVERSITY, UK
- Paul Marshall
  - UNIVERSITY COLLEGE LONDON, UK

#### Art’s track chairs
- Alvaro Cassinelli
  - UNIVERSITY OF TOKYO, JAPAN
- Roc Parés
  - UNIVERSITAT POMPEU FABRA, SPAIN
- Josep Perelló
  - UNIVERSITAT DE BARCELONA, SPAIN

#### Graduate Student Consortium chairs
- Tom Moher
  - UNIVERSITY OF ILLINOIS AT CHICAGO, USA
- Yvonne Rogers
  - UNIVERSITY COLLEGE LONDON, UK

#### Demo chairs
- Anna Carreras
  - ETC INVENTIONS, SPAIN
- Chema Blanco
  - ETC INVENTIONS, SPAIN
- Martí Sánchez Fílba
  - UNIVERSITAT POMPEU FABRA, SPAIN

#### Design Challenge chair
- William “Bill” Verplank
  - CCIRA, STANFORD UNIVERSITY, USA

#### Studio chairs
- Sebastián Mealla C.
  - UNIVERSITAT POMPEU FABRA, SPAIN
- Carmen Platero Vázquez
  - UNIVERSITAT POMPEU FABRA, SPAIN

#### Student Volunteer Chair
- Joan Soler Adillon
  - UNIVERSITAT POMPEU FABRA, SPAIN

#### Management and Production
- Alba B. Rosado
  - MUSICTECHNOLOGY GROUP
  - UNIVERSITAT POMPEU FABRA, SPAIN
- Sebastián Mealla C.
  - UNIVERSITAT POMPEU FABRA, SPAIN

### Concert Chairs
- Sergi Jordà
  - UNIVERSITAT POMPEU FABRA, SPAIN
- Sonia Espi
  - FONACIÓ PRIVADA, SPAIN

### Sponsors Chair
- José Luis González

### Treasurer
- Narcís Parés
  - UNIVERSITAT POMPEU FABRA, SPAIN

### Design and Publication
- Paola Terzi

### Web chair
- Sebastián Mealla C.
  - UNIVERSITAT POMPEU FABRA, SPAIN

### Studio chairs
- Sebastián Mealla C.

### Student Volunteer Chair
- Joan Soler Adillon
  - UNIVERSITAT POMPEU FABRA, SPAIN

### Management and Production
- Alba B. Rosado
  - MUSICTECHNOLOGY GROUP
  - UNIVERSITAT POMPEU FABRA, SPAIN
- Sebastián Mealla C.
  - UNIVERSITAT POMPEU FABRA, SPAIN
The Place

TEI 2013 will take place in Barcelona, the capital and the most populous city of Catalonia, and second largest city in Spain. With a population of almost five million, it is also Europe’s largest metropolis on the Mediterranean coast.

Barcelona is today one of the world’s leading tourist, economic and cultural-sports centres, and its influences in commerce, education, entertainment, media, fashion, science, and the arts all contribute to its status as one of the world’s major global cities. This beautiful city is full of what European cities are known for: outdoor markets, restaurants, shops, museums and churches. TEI 2013 in Barcelona promises to be a remarkable experience where arts, science, culture, world-known culinary delights, and the magnificent Mediterranean landscape will meet technology and innovation.
Design Hub Barcelona

A merger between a museum, a centre and a laboratory directed at promoting an understanding of the design world. It will host all regular programmed talks and presentations, the Arts Track and the Graduate Student Consortium.

Fab Lab Barcelona

Part of the international network of digital fabrication laboratories. It will host Studios and Demos.

The Communication Campus of Universitat Pompeu Fabra

Home of the Music Technology Group (MTG) and the Cognitive Media Technologies Group (CMTech), will host the Design Challenge.

Razzmatazz

The TEI’13 concert party will take place on the evening of the 11th February, at the mythical barcelonian club Razzmatazz. Founded in 2000 and situated in the Poble Nou neighborhood at a 10 minutes walking distance from the DHUB building where the conference takes place, Razzmatazz has programmed along the years artists such as David Byrne, Coldplay, Orbital, Pulp, The Strokes, Kanye West, Blur, Belle and Sebastian, Richie Hawtin, Jeff Mills, Kraftwerk, Arctic Monkeys or Franz Ferdinand, to name just a few.
Banquet by the Mediterranean Sea

TEI 2013 Banquet will take place in the beautiful restaurant Bestial, located by the sea, at the San Sebastian beach, below Frank O. Gehry’s Fish. Bestial is surrounded by a fantastic garden terrace with various levels by the beach overlooking the Mediterranean. 15 minutes walk from Fab Lab Barcelona, in which the Demos will take place just before the banquet.
<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
<th>Location</th>
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<tbody>
<tr>
<td>9:00 - 21:00</td>
<td>Registration</td>
<td>DHUB. ENTRANCE</td>
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<tr>
<td>9:00 - 10:30</td>
<td>Registration</td>
<td>FAB LAB BARCELONA</td>
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<tr>
<td>9:30 - 17:30</td>
<td>Studios</td>
<td>FAB LAB BARCELONA</td>
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<tr>
<td>9:30 - 18:30</td>
<td>Graduate Student Consortium</td>
<td>DHUB. Floor -1</td>
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<tr>
<td>19:30 - 21:00</td>
<td>Welcome Reception</td>
<td>DHUB. FOYER 4th floor</td>
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<tr>
<td>9:00 - 17:30</td>
<td>Registration</td>
<td>DHUB (Main entrance)</td>
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<tr>
<td>9:30 - 10:00</td>
<td>Opening Presentations</td>
<td>DHUB, AUDITORIUM 4th floor</td>
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<td>10:00 - 11:00</td>
<td>Opening Keynote</td>
<td>DHUB, AUDITORIUM 4th floor</td>
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<tr>
<td>11:00 - 11:30</td>
<td>Coffee Break</td>
<td>DHUB 3rd floor</td>
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<tr>
<td>11:30 - 13:00</td>
<td>Papers Session 1: Physical Objective</td>
<td>DHUB, AUDITORIUM 4th floor</td>
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<tr>
<td>12:00 - 14:00</td>
<td>Lunch</td>
<td>DHUB FOYER 4th floor</td>
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<tr>
<td>14:00 - 15:30</td>
<td>Papers Session 2: Learning and Education</td>
<td>DHUB, AUDITORIUM 4th floor</td>
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<tr>
<td>15:30 - 16:00</td>
<td>Coffee Break</td>
<td>DHUB 3rd floor</td>
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<tr>
<td>16:00 - 17:30</td>
<td>Papers Session 3: Material World</td>
<td>DHUB, Auditorium 4th floor</td>
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<tr>
<td>17:30 - 19:30</td>
<td>Design Challenge</td>
<td>UPF Campus. Sala Polivalent, floor-2, Tanger Building</td>
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<tr>
<td>20:00 - 23:00</td>
<td>Concert Party</td>
<td>Razzmatazz (Sala 2)</td>
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<tr>
<td>9:00 - 16:00</td>
<td>Registration</td>
<td>DHUB (Main entrance)</td>
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<tr>
<td>9:30 - 11:00</td>
<td>Papers Session 4: Cultural Perspectives</td>
<td>DHUB, AUDITORIUM 4th floor</td>
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<tr>
<td>11:00 - 11:30</td>
<td>Coffee Break</td>
<td>DHUB 3rd floor</td>
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<tr>
<td>11:30 - 13:00</td>
<td>Panel: The beauty of the paradigms encounter</td>
<td>DHUB, AUDITORIUM 4th floor</td>
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<tr>
<td>12:00 - 14:00</td>
<td>Lunch</td>
<td>DHUB FOYER 4th floor</td>
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<tr>
<td>14:00 - 16:00</td>
<td>Papers Session 5: Compare and Contrast</td>
<td>DHUB, AUDITORIUM 4th floor</td>
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<tr>
<td>16:15 - 19:45</td>
<td>Demos</td>
<td>FABLAB</td>
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<tr>
<td>20:00 - 23:00</td>
<td>Banquet by the Mediterranean Sea</td>
<td>RESTAURANT BESTIAL</td>
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<tr>
<td>9:00 - 17:30</td>
<td>Registration</td>
<td>DHUB (Main entrance)</td>
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<tr>
<td>9:30 - 11:00</td>
<td>Papers Session 6: Getting Mobile</td>
<td>DHUB, AUDITORIUM 4th floor</td>
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<tr>
<td>11:00 - 11:30</td>
<td>Coffee Break</td>
<td>DHUB 3rd floor</td>
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<tr>
<td>11:30 - 13:00</td>
<td>Papers Session 7: Gesture &amp; Toolkits</td>
<td>DHUB, AUDITORIUM 4th floor</td>
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<tr>
<td>12:00 - 14:00</td>
<td>Lunch</td>
<td>DHUB FOYER 4th floor</td>
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<tr>
<td>14:00 - 15:00</td>
<td>Papers Session 8: Specific User Groups</td>
<td>DHUB, AUDITORIUM 4th floor</td>
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<tr>
<td>15:00 - 16:00</td>
<td>Closing Keynote</td>
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<tr>
<td>16:00 - 16:30</td>
<td>Coffee Break</td>
<td>DHUB 3rd floor</td>
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<tr>
<td>16:30 - 17:30</td>
<td>TEI 2013 Closing Remarks</td>
<td>DHUB, AUDITORIUM 4th floor</td>
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</tbody>
</table>

**Program 10-13 th Feb.**

**Permanent Exhibition:**

**Arts Track.**
- DHUB, 3rd floor

**Posters (Works in Progress).**
- DHUB, 4th floor (FOYER)
### Sunday 10th FEB. 2013

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<tr>
<td>9:00 - 10:30</td>
<td>Registration</td>
<td>FAB LAB BARCELONA</td>
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<tr>
<td>9:30 - 17:30</td>
<td>Studios</td>
<td>FAB LAB BARCELONA</td>
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<tr>
<td>9:30 - 18:30</td>
<td>Graduate Student Consortium</td>
<td>DHUB. FLOOR -1</td>
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<tr>
<td>19:30 - 21:00</td>
<td>Welcome Reception</td>
<td>DHUB. FOYER 4Th Floor</td>
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</table>

> **9:00 - 21:00**  
Registration  
DHUB. ENTRANCE.

> **9:00 - 10:30**  
Registration  
FAB LAB BARCELONA (For Studios’ attendees)

> **9:30 - 17:30**  
Studio  
FAB LAB BARCELONA  
Chairs: Carmen Platero Vázquez and Sebastián Mealla C.

LIST OF STUDIOS:

- D.I.Y. Interactive painting techniques + Electronics  
  Paola Guimerans Sanchez

- Tangible Embedded Linux with Raspberry Pi  
  Edgar Berdahl and Quim Llimona

- C4. Creative Coding for iOS  
  Travis Kirton
Designing and Making a Tangible Tabletop Game with ToyVision
Javier Marco, Ian Oakley, Eva Cerezo and Sandra Baldassarri

Natural Interface Exploration
Marius Brade, Mandy Keck, Thomas Gründer, Mathias Müller and Rainer Groh

Motors and Music
David Gauthier, Bill Verplank and Jakob Bak

Make Your Own Piccolo
Greg Saul, Huaishu Peng and Cheng Xu

From Microcontrollers to Cities
Tomás Diez and Alex Posada

> 9.30 - 18.30 GRADUATE STUDENT CONSORTIUM
DHUB, Floor -1
Chairs: Yvonne Rogers and Tom Moher

Each student should present for up to 10 minutes with 5 minutes for feedback and questions. The final session will involve networking activities and twinning of students to see what are the common points in their research projects and PhDs.

This is the programme for the Graduate Student Consortium:

<table>
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<th>DETAIL</th>
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<td>09.20 - 09.30</td>
<td>Introductions</td>
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<tr>
<td>09.30 - 11.00</td>
<td>Presentations - Session 1</td>
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<tr>
<td></td>
<td>Chairs: Yvonne Rogers and Tom Moher</td>
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<tr>
<td></td>
<td>Students: Jiffer Harriman, Brian Tuohy, Ginger White, Amartya Banajee,</td>
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<td></td>
<td>Christian Frisson</td>
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<tr>
<td>11.00 - 11.30</td>
<td>Coffee break</td>
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<tr>
<td>11.30 - 13.00</td>
<td>Presentations - Session 2</td>
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<td></td>
<td>Chairs: Leah Beuchley and Mike Horn</td>
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<td></td>
<td>Students: David Mellis, Juan Gabriel Tirado, Christina Cylla, Daniel</td>
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<td>Wessolek, Katrin Wolf, Paulo Guerra</td>
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<tr>
<td>13.00 - 14.00</td>
<td>Lunch</td>
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<tr>
<td>14.00 - 15.30</td>
<td>Presentations – Session 3</td>
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<td></td>
<td>Chairs: Mike Horn and Leah Beuchley</td>
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<td></td>
<td>Students: Sibel Deren Guler, Jiann Hughes, Gabrielle Le Bihan, Simone</td>
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<td></td>
<td>Mora, Brian Eschrich, David Stolarsky</td>
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<td>15.30 - 16.00</td>
<td>Coffee Break</td>
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<tr>
<td>16.00 - 18.00</td>
<td>Round table activities and networking</td>
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<td></td>
<td>Chairs: Tom Moher and Yvonne Rogers</td>
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<tr>
<td>18.00 - 18.30</td>
<td>Poster making</td>
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</table>

The Graduate Student Consortium was supported in part by the National Science Foundation under Grant Number IIS-1302373. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the National Science Foundation.

> 19:30 - 21:00 Welcome Reception
DHUB, FOYER 4th floor

With drinks, snacks, and surprises!
During the reception, registration will also be available at this building.
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<tr>
<td>20:00 - 23:00</td>
<td>Concert Party</td>
<td>RAZZMATAZZ (Sala 2)</td>
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**Monday 11th**

FEB. 2013

> 9:30- 10:00 Opening Presentations  
DHUB, AUDITORIUM (4th floor).  
Conference Chairs: Sergi Jordà and Narcis Parés  
Program Chairs: Martin Kaltenbrunner, Dave Kirk and Paul Marshall
Tangible Interfaces in Music Listening and Performance
Frédéric Bevilacqua and Norbert Schnell

The recent availability of both, affordable motion capture technology and mobile platforms, allows for creating a new generation of musical instruments and interactive audio applications. These systems are currently redefining the boundaries between music listening and music performance. On one hand, new devices and applications, enable music listening as an active participation in musical interpretation and composition. On the other hand, new digital musical instruments integrate notions of perception, generativity, and collaboration, questioning the performance practices and functions of traditional instruments. In this context, the design of novel instruments and interactive audio applications becomes the exploration of infinite possibilities to create relationships between bodily action, physical objects, sound, and musical structures. Design, here may rely on existing - musical and extra-musical - metaphors and bodily knowledge as well as on abstract concepts and topologies.

The musical interaction scenarios and playing techniques that we have developed over the past years involve everyday objects and games as well as free gestures that have been created by listeners in response to sound and music. Our presentation will include numerous examples, such as the MO, Modular Musical Objects, and Urban Musical Game featuring playful collaborative interaction scenarios.

Frederic Bevilacqua is the head of the Real Time Musical Interactions team at IRCAM - Institute for Music/Acoustic Research and Coordination in Paris. His research concerns the understanding of the interaction between gestures and sound processes, and the development of gesture-based musical interaction systems. He holds a master degree in physics and a Ph.D. in Biomedical Optics from the Ecole Polytechnique Fédérale de Lausanne (Swiss Federal Institute of Technology in Lausanne). He also studied music at the Berklee College of Music in Boston and has participated in different music and media arts projects. From 1999 to 2003 he was a researcher at the University of California Irvine. He joined IRCAM in October 2003 to develop gesture analysis tools for music and performing arts.

Norbert Schnell is a researcher and developer at the Real-Time Musical Interactions team at IRCAM focussing on real-time digital audio processing techniques for interactive music applications. He studied Telecommunications and Music in Graz/Austria and worked as programmer and sound designer with the Musiklabor Wien. At IRCAM he initiated and participated in numerous international research and development projects as well as artistic works in the field of interactive audio-visual installations, music pedagogy, and sound simulation. He chaired the 6th International Conference on New Interfaces for Musical Expression (NIME) in 2006 and held the DAAD Edgard Varèse Guest Professorship for Electronic Music at the Technische Universität Berlin in 2007. His current research focuses on the animation of digitized sounds and their reenactment by playful scenarios in the design of interactive audio applications.
> 13:00 - 14:00 Lunch
DHUB FOYER (4th Floor).

> 14:00 - 15:30 Papers Session 2: Learning and Education
DHUB, AUDITORIUM FOYER (4th Floor).
Chair: Mike Horn

A multimodal approach to examining ‘embodiment’ in tangible learning environments (long)
Sara Price, Institute of Education, London
Carey Jewitt, Institute of Education, London

The Digital Dream Lab: Tabletop Puzzle Blocks for Exploring Programmatic Concepts (short)
Hyunjoo Oh, Carnegie Mellon University
Anisha Deshmane, Carnegie Mellon University
Feiran Li, Carnegie Mellon University
Ji Yeon Han, Carnegie Mellon University
Matt Stewart, Carnegie Mellon University
Michael Tsai, Carnegie Mellon University
Xing Xu, Carnegie Mellon University
Ian Oakley, University of Madeira

FireFlies: Physical Peripheral Interaction Design for the Everyday Routine of Primary School Teachers (short)
Saskia Bakker, Eindhoven University of Technology
Elise van den Hoven, University of Technology Sydney
Berry Eggen, Eindhoven University of Technology

Comparing Motor-Cognitive Strategies for Spatial Problem Solving with Tangible and Multi-touch Interfaces (short)
Alissa Antle, Simon Fraser University
Sijie Wang, Google

> 15:30 - 16:00 Coffee Break
DHUB (3rd Floor).

> 16:00 - 17:30 Papers Session 3: Material World
DHUB, AUDITORIUM (4th floor).
Chair: Yvonne Rogers

A Design Space for Ephemeral User Interfaces (long)
Tanja Döring, University of Bremen
Axel Sylvester, Independent Researcher
Albrecht Schmidt, University of Stuttgart

Microcontrollers as Material: Crafting Circuits with Paper, Conductive Ink, Electronic Components, and an “Untoolkit” (short)
David Mellis, MIT Media Lab
Sam Jacoby, MIT Media Lab
Leah Buechley, MIT Media Lab
Hannah Perner-Wilson, MIT Media Lab
Jie Qi, MIT Media Lab

Empowering Materiality-Inspiring the Design of Tangible Interactions (short)
Magdalena Schmid, BMW AG, Munich
Sonja Rümelin, BMW AG, Munich
Hendrik Richter, University of Munich

Actuating Mood: Design of the Textile Mirror (short)
Felecia Davis, M.I.T.
Asta Roseway, Microsoft Research
Erin Carroll, University of North Carolina at Charlotte
Mary Czerwinski, Microsoft Research

> 17:30 - 19:30 Design Challenge
UPF CAMPUS (SALA POLIVALENT, Floor -2, Tanger Building)
Chair: Bill Verplank
Snacks and Drinks will be provided during the activity.

Get the party started at TEI!
Design a fun game or performance that celebrates tangibility. Build a new toy, instrument or prop and how to use it in a game, song or dance. How might the stories of tangible, embedded and interactive technologies be passed on to the next generation?
The ICUB (Culture Institute from Barcelona City Council) will give a 1,000 Euro prize to the best team presented.
These are the Design Challenge entries:

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<tr>
<th>ENTRY</th>
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<tr>
<td>Superheros</td>
<td>Pontific Catholic University</td>
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<td>Cheers</td>
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<td>Acidable</td>
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<td>Touchthrough</td>
<td>University of Technology Compiègne</td>
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<td>Heart Beating Balls</td>
<td>Universitat Pompeu Fabra</td>
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<td>Federkraft</td>
<td>Technical University Dresden</td>
<td>Dresden, Germany</td>
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<tr>
<td>Rock-Paper-Scissors</td>
<td>University of Toronto</td>
<td>Toronto, Canada</td>
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</tbody>
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> 20.00 - 23.00 Concert Party
RAZZMATAZZ (SALA 2)
Chairs: Sonia Espi and Sergi Jordà.
Drinks and Sandwiches will be provided during the concert.

**CONCERT PROGRAM**

**MO - Body and Sound**

Frederic Bevilacqua and Norbert Schnell

The performance will feature the MO Modular Musical Objects, as well as audiovisual materials of the MindBox project using a tangible interface. Developed at IRCAM by Real-Time Musical Interactions team lead by Frederic and Norbert, the “MO” (Modular Musical Objects) interfaces can be assembled to form an ensemble of connected objects communicating wirelessly, allowing for the exploration of novel gestural interfaces for musical expressions around the collaborative use of gestures, body movements and touch. The interfaces “MOs”, created during the project Interlude in collaboration with several partners, won the first prize at the 2011 third annual Margaret Guthman Musical Instrument Competition. The MindBox project by Christian Graupner, Norbert Schnell and Roberto Zappala won the second prize at the 2011 third annual Margaret Guthman Musical Instrument Competition. The performance will feature additional audio materials created by Andrea Cera and Pierre Jodlowski.

**Elementary Excitations**

Plaid and Bruno Zamborlin

New collaboration between british experimental dance music legend Plaid and computer music researcher Bruno Zamborlin, using a new system called Mogees that permits to transform everyday objects into powerful digital music instruments.

**Hypo Chrysos**

Carles López

Action art for vexed body and biophysical media (Xth Sense Biosensing Wearable Technology)

Marco Donnarumma

Low frequency acoustic sounds are produced by the resistance of the artist’s muscle and the pulsating blood in his veins. These sounds are digitally amplified, encoded in an audiovisual scape and diffused by eight loudspeakers and a video projector.

**Reactable**

Carles López

The Reactable was conceived as an instrument to bring back the expressive possibilities of traditional instruments to musicians who are working with new technologies, by allowing them to touch and see the music while performing. It uses concepts of modular synthesis, sampling, advanced digital effects processing, and DJing and brings them into multitouch and tangible interaction.
Palos y Palancas

Lina Bautista, Mauricio Iregui and Nicolas Villa

Palos y Palancas is a project based on the implementation of two originally design interfaces for the performance of live electronic music. “Palos” is a set of futuristic drumsticks which allow for the generation of live loops and expressive musical gestures. Apart from their rhythmic features, with the use of an accelerometer on each stick, the performer is able to generate and manipulate sound effects, control time stretch on samples and process live recorded loops. “Palancas” is based on three bars, which are based on the classic joysticks of the original game consoles. The bars can be bent on any direction which allow for incredible expressive capabilities. It also incorporates buttons and faders for triggering samples and setting changes. Linalab is a solo project of Lina Bautista. It’s based on live looping, real-time audio processing with the use of an augmented electric guitar, and live vocals. Linalab and Palos y Palancas is a collaboration that proposes complex soundscapes of electronics, beats, and acoustic instruments with the utilization of new musical interactive interfaces of their original design.
We strongly believe that a multiplicity of perspectives is highly desirable. Toward this, the panel will consist of four “(rising) star” TEI members drawing from different traditions, such as psychology, design, engineering and art. Next to this live panel, we will have a shadow panel of “luminaries” from the TEI community, who will be interviewed before the session and their opinions and insights will be included in the panel discussion. Together, with support from the audience, we will construct concept maps of TEI during the panel session. This panel itself is an experiment with ways to bring forward your own as well as to adopt other perspectives, in order to shed light on the richness and values of TEI.

> 13:00 - 14:00  Lunch  
DHUB FOYER (4th Floor).

> 14:00 - 16:00 Papers Session 5: Compare and Contrast  
DHUB, AUDITORIUM (4th floor).  
Chair: Dave Kirk

On Interface Closeness and Problem Solving (long)  
Thomas Donahue, Tufts University  
G. Michael Poor, Baylor University  
Martez Mott, University of Washington  
Laura Leventhal, Bowling Green State University  
Guy Zimmerman, Bowling Green State University  
Dale Klopfer, Bowling Green State University

Supporting offline activities on interactive surfaces (short)  
Augusto Esteves, University of Madeira, UMa  
Michelle Scott, University of Madeira, UMa  
Ian Oakley, University of Madeira, UMa

Reach across the boundary: evidence of physical tool appropriation following virtual practice (short)  
Ali Mazalek, Georgia Institute of Technology  
Timothy Welsh, University of Toronto  
Michael Nitsche, Georgia Institute of Technology  
Connor Reid, University of Toronto  
Paul Clifton, Georgia Institute of Technology  
Fred Leighton, Georgia Institute of Technology  
Kai Tan, Georgia Institute of Technology

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> 9:30 - 11:00  Papers Session 4: Cultural Perspectives  
DHUB, AUDITORIUM (4th floor).  
Chair: Eva Hornecker

From Big Data to Insights: Opportunities and Challenges for TEI in Genomics (long)  
Orit Shaer, Wellesley College  
Ali Mazalek, Georgia Institute of Technology  
Brygg Ullmer, Louisiana State University  
Miriam Konkel, Louisiana State University

The Role of Cultural Forms in Tangible Interaction Design (short)  
Michael Horn, Northwestern University

Magical Realities in Interaction Design (short)  
Majken Kirkegaard Rasmussen, Department of Computer Science Aarhus University

Embodiment: Auditory Visual Enhancement of Interactive Environments (short)  
Richard Salmon, University Of Western Sydney  
Garth Paine, Arizona State University

> 11:00 - 11:30  Coffee Break  
DHUB (3rd Floor).

> 11:30 - 13:00 Panel: The beauty of the paradigms encounter  
DHUB, AUDITORIUM (4th floor).  
Coordinators: Caroline Hummels and Brygg Ullmer

This plenary dialogue addresses a seemingly (perhaps unintentionally) infrequently discussed topic: how to reconcile the disparate conceptual paradigms and core values that make up TEI? The TEI community, with the TEI conference series as a primary communication platform, was originally founded to bring together different viewpoints so that we can share different perspectives and foster emergence of common understandings. This being said, actively sharing, contrasting and connecting perspectives is easier said than done, especially once a new field starts to mature. Where does today’s TEI stand in the clash, enrichment and cross-fertilization of paradigms? Are some approaches implicitly dominating the field? Are we truly aware of the large variety of perspectives and approaches? Looking at work presented at TEI since its inception, its hybrid nature stands out. But over the years, especially looking at how work gets conceptualized, we question if there are enough discussions on diversity and attempts to reflect, criticize, and engage actively across different paradigms. In this panel discussion, we will address commonalities as well as fundamental differences that exist between disciplines and paradigms, exploring how all of these frames may affect, tint and flavor TEI-related work.

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> 12:00 - 13:00  Lunch  
DHUB Foyer (4th Floor).
Drag and Drop the Apple: The Semantic Weight of Words and Images in Touch-Based Interaction (long)
Ilhan Aslan, ICT&S Center, University of Salzburg
Martin Murer, ICT&S Center, University of Salzburg
Verena Fuchsberger, ICT&S Center, University of Salzburg
Andrew Fugard, ICT&S Center, University of Salzburg
Manfred Tscheligi, ICT&S Center, University of Salzburg

Physical Games or Digital Games? Comparing Support for Mental Projection in Tangible and Virtual Representations of a Problem Solving Task (short)
Augusto Esteves, University of Madeira, UMa
Elise van den Hoven, University of Technology Sydney
Ian Oakley, University of Madeira, UMa

> 16:15 - 19:45 Demos
FABLAb, Carrer de Pujades, 102, 08005 Barcelona.
Chairs: Marti Sánchez-Fíbula, Anna Carreras and Chema Blanco
Coffee, drinks and snacks will be provided during the activity.

PUBLISHED AS PAPERS:

SpectroFlexia: interactive stained glass as a flexible peripheral information display
Attalan Mailvaganam, Eindhoven University of Technology
Saskia Bakker, Eindhoven University of Technology

In Touch with Space: Embodying Live Data For Tangible Interaction
Trevor Hogan, Strathclyde University
Eva Hornecker, Strathclyde University

Volumetric Linear Gradient:
Methods for and Applications of a Simple Volumetric Display
Daniel Wessolek, Bauhaus-University Weimar

Radical Clashes: what tangible interaction is made of
jelle van dijk, Eindhoven University of Technology
Camille Moussette, Umeå Institute of Design
Christoffel Kuenen, Umeå Institute of Design
Caroline Hummels, Eindhoven University of Technology

C4: A Creative-Coding API for Media, Interaction and Animation
Travis Kirton, University of Calgary
Sebastian Boring, University of Calgary
Dominikus Baur, University of Calgary
Lindsay MacDonald, University of Calgary
Sheelagh Carpendale, University of Calgary

LiquiTouch:
Liquid as a Medium for Versatile Tactile Feedback on Touch Surfaces
Hendrik Richter, University of Munich LMU
Felix Manke, University of Munich LMU
Moriel Seror, University of Munich LMU

Designing Tangible Magnetic Appcessories
Andrea Bianchi, KAIST
Ian Oakley, Madeira-ITI

Don’t Open That Door:
Designing Gestural Interactions for Interactive Narratives
Paul Clifton, Georgia Institute of Technology
Jared Caldwell, Georgia Institute of Technology
Isaac Kulk, Georgia Institute of Technology
Riccardo Fassone, Università degli Studi di Torino
Jonathan Cutrell, Georgia Institute of Technology
Kevin Terraciano, Georgia Institute of Technology
Janet Murray, Georgia Institute of Technology
Ali Mazalek, Georgia Institute of Technology

Form and function: Experiences constructing prototype electronic devices using .NET Gadgeteer
Steve Hodges, Microsoft Research Cambridge
Stuart Taylor, Microsoft Research Cambridge
Nicolas Villar, Microsoft Research Cambridge
James Scott, Microsoft Research Cambridge
John Helmes, Microsoft Research Cambridge

ToyVision: A Toolkit to Support the Creation of Innovative Board-Games with Tangible Interaction
Javier Marco Rubio, University of Madeira
Sandra Baldassarri, University of Zaragoza
Eva Cerezo, University of Zaragoza
Display Blocks: a Set of Cubic Displays for Tangible, Multi-Perspective Data Exploration
Pol Pia, MIT Media Lab
Pattie Maes, MIT Media Lab

Hybrid Interface Design for Distinct Creative Practices in Real-Time 3D Filmmaking
Michael Nitsche, Georgia Institute of Technology
Friedrich Kirschner

Wo. Defy: Wearable Interaction Design Inspired by a Chinese 19th Century Suffragette Movement
Thecla Schiphorst, Simon Fraser University
Wynnie (Wing Yi) Chung, Simon Fraser University
Emily Ip, Simon Fraser University

HideOut: Mobile Projector Interaction with Tangible Objects and Surfaces
Karl Willis, Disney Research
Takaaki Shiratori, Microsoft Research Asia
Moshe Mahler, Disney Research

Animate Mobiles: Proxemically Reactive Posture Actuation as a Means of Relational Interaction with Mobile Phones
Fabian Hemmert, Berlin University of the Arts
Matthias Löwe, Berlin University of the Arts
Anne Wohlauf, Berlin University of the Arts
Gesche Joost, Berlin University of the Arts

LOLLio - Exploring Taste as Interaction Modality
Martin Murer, ICT&S Center, University of Salzburg
Ilhan Aslan, ICT&S Center, University of Salzburg
Manfred Tscheligi, ICT&S Center, University of Salzburg

WORKS IN PROGRESS:

New developments in the O-bow
Dylan Menzies, De Montfort University
Brian Brammer, De Montfort University
Dilip Chauhan, De Montfort University
Mark Cuckow, De Montfort University

A demo of batch-produced sensing devices, disassembled
Mark Hauenstein, Goldsmiths, University of London
Nadine Jarvis, Goldsmiths, University of London
David Cameron, Goldsmiths, University of London
Andy Boucher, Goldsmiths, University of London

Feelable User Interfaces: An Exploration of Non-Visual Tangible User Interfaces
Katrin Wolf, TU Berlin
Peter Bennet, University of Bristol

An Example of Creative Physical Modeling: A Simulation of the Haptic Drum
Edgar Berdahl, TU Berlin

tH toolkit; for DIY everyday peer-to-peer objects
Jim Wood, Goldsmiths, University of London

Drum Duino: a Tangible Interface to Create Rhytmic Music with Everyday Objects
Saldien Jelle, IDC, Howest
Jolien De Ville, IDC, Howest

Skweezees: Soft Objects that Sense their Shape Shifting
Luc Geurts, Leuven Engineering College
Karen Vanderloock, Leuven Engineering College
Vero Vanden Abeele, Leuven Engineering College

Plus Minus: Passive Education of Basic Circuitry Through DIY Product Design
Jason Kim, Parsons, The New School of Design

A Taxonomy-Based Approach Towards NUI Interaction Design
Florian Klompmaker, University of Paderborn
Volker Paelke, Leibniz Universität Hannover

Exploring wearable music players with focus on subculture and style
Vasiliki Tsaknaki, Mobile Life, KTH
Ylva Fernaeus, KTH

Tangible Synergetic Domes
Fred Leighton, Georgia Institute of Technology
Ali Mazalek, Georgia Institute of Technology
Claudia B. Rebola, Georgia Institute of Technology
Sculpton: A Malleable Tangible Object for Musical Expression
Alberto Boem, University of Art and Design Linz

Tangible Syntaxes: Exploring embodied and tangible I/O programming systems for children
Juan Gabriel Tirado, Universitat Pompeu Fabra
Mónica Rikic
Giovanni Maria Troiano, Universitat Pompeu Fabra

Augmenting Real-world Social Networking with Vibrotactile Display
Nanda Khaorapapong, Queen Mary University of London
David Cox, Lean Mean Fighting Machine
Matthew Purver, Queen Mary University of London

Self Touch to Touch Others: Designing the Tactile Sleeve for Social Touch
Gjis Huisman, University of Twente
Aduen Darriba Frederiks, Amsterdam University of Applied Sciences
Betsy van Dijk, University of Twente

SuperShoes: Facilitating urban rediscovery
Dhairya Dand, MIT Media Lab
Henry Holtzman, MIT Media Lab

Tango Cards: A Card-Based Design Tool for Designing Tangible Learning Games
Ying Deng, Simon Fraser University
Alissa N. Antle, Simon Fraser University
Carman Neustaedter, Simon Fraser University
Allen Bevans, Simon Fraser University

Puppets Duets in [E]ngaging Major, Op 33
Yoram Chisik, University of Madeira
Monchu Chen, University of Madeira
M Clara Correia Martins, University of Madeira

Sonic Juggling Balls
Luuk Schipperheyn, STEIM
Marije Baalman, STEIM

Designing to augment memory appreciation: The system of Mobile-light
Wang, Qi, University Hangzhou
Fangtian Ying, University Hangzhou
Jianxing Cai, University Hangzhou
Cheng Yao, University Hangzhou

Telehaptic Awareness
David Cuartielles, Malmö University
Andreas Göransson, Malmö University
Tony Olsson, Malmö University
Stahl Stenslie, Malmö University

Constructable: interactive construction of functional mechanical devices
Stefanie Mueller, Hasso Plattner Institute
Pedro Lopes, Hasso Plattner Institute
Konstantin Kaeler, Hasso Plattner Institute
Bastian Kruck, Hasso Plattner Institute
Patrick Baudisch, Hasso Plattner Institute

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Patrick Baudisch, Hasso Plattner Institute

> 20:00 - 23:00 BANQUET by the Mediterranean Sea
BESTIAL. Ramón Trias Fargas 2-4, 08005 Barcelona

TEI 2013 Banquet will take place in the beautiful restaurant Bestial, located by the sea, at the San Sebastian beach, below Frank O. Gehry’s Fish. Bestial is surrounded by a fantastic garden terrace with various levels by the beach overlooking the Mediterranean.

15 minutes walk from Fab Lab Barcelona, in which the Demos will take place just before the banquet.
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<td>Papers Session 6: Getting Mobile</td>
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<td>11:00 - 11:30</td>
<td>Coffee Break</td>
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<td>DHUB, AUDITORIUM 4th floor</td>
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<td>13:00 - 14:00</td>
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<td>14:00 - 15:00</td>
<td>Papers Session 8: Specific User Groups</td>
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<td>16:00 - 16:30</td>
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<td>16:30 - 17:30</td>
<td>TEI 2013 Closing Remarks</td>
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> 9:30 - 11:00 Papers Session 6: Getting Mobile
DHUB, AUDITORIUM (4th floor).
Chair: Francis Quek

Unifone: Designing for Auxiliary Finger Input in One-Handed Mobile Interactions (long)
David Holman, Human Media Lab, Queen’s University
Andreas Hollatz, Human Media Lab, Queen’s University
Amartya Banerjee, Tangible Interaction Design And Learning Lab, Northwestern University
Roel Vertegaal, Human Media Lab, Queen’s University

Tickle: A Surface-independent Interaction Technique for Grasp Interfaces (short)
Wolf Katrin, TU Berlin
Schleicher Robert, TU Berlin
Kratz Sven, FX Palo Alto Laboratory, CA
Rohs Michael, University of Hannover

FlexView: An Evaluation of Depth Navigation on Deformable Mobile Devices (short)
Jesse Burstyn, Queen’s University
Amartya Banerjee, Northwestern University
Roel Vertegaal, Queen’s University

Cubble: A Multi-Device Hybrid Approach Supporting Communication in Long-Distance Relationships (short)
Robert Kowalski, University of Munich
Sebastian Loehmann, University of Munich
Doris Hausen, University of Munich

> 11:00 - 11:30 Coffee Break
DHUB (3rd Floor).

> 11:30 - 13:00 Papers Session 7: Gesture & Toolkits
DHUB, AUDITORIUM (4th floor).
Chair: Martin Kaltenbrunner

GestureAgents: An Agent-Based Framework for Concurrent Multi-Task Multi-User Interaction (long)
Carles F. Julià, Universitat Pompeu Fabra
Nicolas Earnshaw, Universitat Pompeu Fabra
Sergi Jordà, Universitat Pompeu Fabra

Enclosed: a component centric interface for designing prototype enclosures (short)
Christian Weichel, Lancaster University
Manfred Lau, Lancaster University
Hans Gellersen, Lancaster University

Demonstration-Based Vibrotactile Pattern Authoring (short)
Kyungpyo Hong, Pohang University of Science and Technology
Jaebong Lee, Pohang University of Science and Technology
Seungmoon Choi, Pohang University of Science and Technology

exTouch: Spatially-Aware Embodied Manipulation of Actuated Objects Mediated by Augmented Reality (short)
Shunichi Kasahara, Sony Corporation
Ryuma Niiyama, MIT Media Lab
Valentin Heun, MIT Media Lab
Hiroshi Ishii, MIT Media Lab

> 13:00 - 14:00 Lunch
DHUB FOYER (4th Floor).

> 14:00 - 15:00 Papers Session 8: Specific User Groups
DHUB, AUDITORIUM (4th floor).
Chair: Paul Marshall

Designing Interactive Content with Blind Users for a Perceptual Supplementation System (short)
Matthieu Tixier, Université de technologie de Compiegne
Charles Lenay, Université de technologie de Compiegne
Gabrielle Le Bihan, Université de technologie de Compiegne
Olivier Gapenne, Université de technologie de Compiegne
Dominique Aubert, Université de technologie de Compiegne

Wrapping Up LinguaBytes, For Now (short)
Bart Hengeveld, Technische Universiteit Eindhoven
Caroline Hummels, Technische Universiteit Eindhoven
Hans van Balkom, Radboud Universiteit Nijmegen
Riny Voort, Radboud Universiteit Nijmegen
Jan de Moor, Radboud Universiteit Nijmegen
Touch-Screens are Not Tangible: Fusing Tangible Interaction with Touch Glass in Readers for the Blind (short)
Yasmine El-Glaly, Virginia Polytechnic Institute and State University
Francis Quek, Virginia Polytechnic Institute and State University
Tonya Smith-Jackson, Virginia Polytechnic Institute and State University
Gurjot Dhillon, Virginia Polytechnic Institute and State University

> 15:00 -16:00 Closing Keynote
DHUB, AUDITORIUM (4th floor).

Metaphors, Haptics and Celebration
Bill Verplank

Metaphors
Users’ conceptual Models are not Metaphors but in user-interface design it is important to have both. A user’s conceptual Model must have the rigor of science and mathematics but it can be inspired and motivated with Metaphor. The “desktop metaphor” is not meant literally; e.g. what is a window doing on my desktop? Shouldn’t it be on the wall? Is it the “office metaphor” or the “desktop metaphor”? A proper framework for interaction design has both: Metaphor (poetry) and Model (science) as well as Engineering (task analysis) and Scenarios (design). Metaphors also organize competing paradigms. Paradigms for computers have moved metaphors from person (intelligence, language, autonomy) to tool (task, goal, efficiency) to medium (experience, message, expression).
If TEI is a paradigm what are its underlying metaphors?

Haptics
The study of tactile perception and action is known as haptics. Haptic technology supports the earliest form of how we act and reason: “enactive”. As children develop they progress from enactive to iconic to symbolic mentalities. Ironically, interfaces have retrogressed from symbolic to iconic to enactive.
A useful framework for haptics is Lederman and Klatsky’s “Exploratory Procedures”. What do you do with your hands to learn about the world: touch, press, stroke, trace, enclose, lift? Unfortunately, many of the objects we interact with have complex kinematics and dynamics. I propose some Dynamic Exploratory Procedures as a way to think about TEIs.

Celebration
The student design challenge for this year’s conference is “Celebration: a new toy, instrument or prop and how to use it in a game song or dance”. I will reflect on my inspirations for the theme and the response of the students. What are the things we celebrate, what stories do we tell, who are our heroes and what were their epic accomplishments?

> 16:00-16:30  Coffee Break
DHUB (3rd Floor).

> 16:30-17:30  TEI 2013 Closing Remarks
DHUB, AUDITORIUM (4th floor).

William (Bill) Verplank is a designer and researcher with a focus on interactions between humans and computers. He is currently a visiting scholar at Stanford University’s CCRMA. He received a bachelor’s degree in mechanical engineering and product design from Stanford, and then went on to MIT to complete a PhD in man-machine systems. He worked at Xerox from 1978-1986 testing and refining the Xerox Star graphical user interface. He worked with Bill Moggridge, first at IDTwo and then at IDEO (1986–1992), bringing “interaction design” to the world of product design. During that time he taught courses in Product Design (ME) and HCI (CS) at Stanford.
From 1992-2000 at Interval Research, he directed research on design, tangibility and music. At Stanford’s CCRMA (Music) he is a part-time lecturer teaching courses in interaction design and input devices. He also teaches and lectures internationally. He was on the steering committee and taught at the Interaction Design Institute Ivrea (2000–2005), and since 2009 is a visiting lecturer for the Copenhagen Institute of Interaction Design (CiID).
Tangible, Embedded and Embodied have been attributes of art since the origin of mankind. This exhibition is about artists who incorporate these ancient art attributes into the presently primitive human-computer interaction systems of our time. In this beginning of the XXI Century, art is questioning many of the assumptions which underlie the early desktop, laptop and even handheld interaction models. Such models have become conventional standards by imposing cartoonish metaphors which mimic the human relations with the objects in the world: Icons of folders, helm-wheels or tool-boxes, paper-clip assistants and miniature trash bins have accompanied us humans in our first steps into the first computational environments and cyberspaces. Within these corporation-operated worlds, human interaction with such simulated objects has been used more as a means to retrieve digitized contents and less as a meaningful and emotionally fulfilling experience by itself. But the more that we assume that computers are taking over our entire live times (from our first preschool sensory awareness apps to our posthumous twitts) the more we long for that time to be filled with engaging interactions that can make us participants more human. We hope you will enjoy your participation in the art proposals that you are about to experience. We found these to be the most challenging in terms of form, concept, context and suggested relations when selecting them among thirty submissions.
During this twenty minutes action I pull two concrete blocks in a circle. My motion is oppressively constant. I have to force myself into accepting the pain until the action is ended. The increasing strain of my corporeal tissues produces continuous bioacoustic signals. These comprise of blood flow, muscle sound bursts, and bone crackles that are amplified, distorted, and played back through eight loudspeakers. The same bioacoustic data stream excites an OpenGL-generated swarm of virtual entities, lights, and organic forms diffused by a video projector. The work brings together different media so as to creatively explore the processes wherein physicality, adaptive biotechnology, and musicianship (or better, the lack of) collide. This article elaborates on the methodology underpinning the piece. It describes, both conceptually and technically, how the performer's physical strain and the resulting music are integrated using bioacoustic sensing.

Transience: Aesthetics of Dynamic Colors inside Japanese Calligraphy
Kohei Tsuji, Akira Wakita

Transience is the Japanese calligraphy work with dynamic color changes. The scene where the letter colors are changing from moment to moment can give an affluent dynamism and feeling of vitality of calligraphy to viewers, and at the same time, it can express stream of time. Calligraphy is integrated with technology and materials seamlessly and Transience is produced to show ever-changing aesthetics fermented in Japan. In order to change letter colors on paper, we developed our original chromogenic mechanism from functional inks and conductive materials. For producing the chromogenic technology suitable for paper, we examined ink materials repeatedly, and as a result we realized the expression where calligraphy harmonizes with computer.

Transparent Sculpture: An Embodied Auditory Interface for Sound Sculpture
Daichi Misawa

Toward ecologically distributed interactions of sound in the real world, this paper presents an embodied auditory interface for a sound sculpture; it is composed of orientations’ structure of sounds from directional speakers and a pedestal to capture a certain real space.

Hypo Chrysos: Mapping in Interactive Action Art Using Bioacoustic Sensing
Marco Donnarumma

This piece will be performed during the TEI concert at Razzmatazz on Monday 11th (see p. 32-33).

Hypo Chrysos (HC) is a work of action art for vexed body and biophysical media.

E-maestro: The Electronic Conductor
Rui Avelans Coelho

This project is an attempt to recreate the musical experience of being in front of a symphony orchestra containing more than 80 members. The interaction between the audience and the orchestra is achieved through the development of an interactive control panel enabling users to manipulate groups of musicians, truly putting the viewer in the role of the symphony orchestra conductor.

Selected Works
FLEISCHWOLF, an interactive installation

Ivan Petkov

The title of the interactive sound installation “Fleischwolf!” is based on the German word for meat grinder. It therefore consists of a mechanical kitchen meat grinder mounted on a wooden table. Turning the crank of the grinder causes the machine to emit a sound that initially resembles a very deep bass voice. When the crank is turned more vigorously and faster, the characteristics of the sound change. At a certain speed, a baby’s scream becomes recognizable, but due to the construction of the meat grinder, it’s hard to maintain this sound. So whether this scream is audible at all, depends on the actuation of the installation users. The work is exploring the well-known Kuleshov effect, an integral part of the video art and cinema, but with the means of a tangible interface. It is an experiment in the context of media psychology and interactive art. Although it consists of very specific, interconnected elements, the message it conveys is determined by the experiences and backgrounds of each individual visitor.

Buildasound

Monica Rikic

Buildasound is a sound building blocks game. It consists in creating shapes at the same time that you generate new sounds: there is no single objective (winning or losing), but instead the entertainment involved in playing and the opportunity to discover new melodies and constructions and constant creation based on the different positions of the blocks.

Cubes

JMichal Rinott, Shachar Geiger, Eran Gal-Or, Luka Or

Cubes is a collection of 20 objects combing a single input with a single output. Cubes celebrates the potential of simple tangible interactions for engagement and pleasure. By fixing the form of these interactive objects into the simplest one: a cube, we can explore affordances and behavior in a “lab-like” environment. A new aesthetic language is created by making the cubes transparent, equally sized and self-contained.

From Wet Lab Bench to Tangible Virtual Experiment: SynFlo

Wendy Xu, Kimberly Chang, Nicole Francisco, Consuelo Valdes, Robert Kincaid, Orit Shaer

SynFlo is an interactive installation that utilizes tangible interaction to make core concepts of synthetic biology accessible to the public. This playful installation allows users to create useful virtual life forms from standardized genetic components through the manipulation of augmented object that mirror scientific instruments in order to explore synthetic biology concepts and protocols. These virtual E.coli, can serve as environmental biosensors that when deployed into an environment represented by a tabletop computer, detect toxins and change their color as an indicator. The goal of this project is to explore ways to develop effective interactive activities for outreach in STEM without the limitations of access to a lab bench while communicating the excitement of cutting-edge research.

Movement Crafter

Larissa Pschetz, Richard Banks, Mike Molloy

The movement crafter attempts to reconcile the pace of new technologies with traditional crafting activities that are performed as pastimes. The project explores concepts of quiet communication and technology hybrids and attempts to support crafting without making the craftsperson overly self-conscious of their practice.
Bestiari raises from CaboSanRoque’s frustration caused by the permanent postponement of a dream that after years still continues to fizzle: a concert with an orchestra of real animals: dogs, cats, parrots and monkeys moaning and playing the piano like Thelonius Monk and Cecil Taylor. Tired of despair, CaboSanRoque decided to build his own orchestra of animals with mechanical musical skills, from the retrieval and assembly of everyday objects such as typewriters, printer or engine plates. These mechanical animals with lives of their own are capable of creating a musical discourse and an ambiguous dialogue between the concept of machine and the animal violence conveyed through the texts of medieval bestiaries. Bestiary is therefore the open scenic interpretation that CaboSanRoque does of the bestiaries texts from different periods and cultures, using the concept of concealment/revelation typical of early Christianity. Bestiari was premiered the 6th of November 2011 and has received several awards. Under the name of an old ocean liner, CaboSanRoque was founded in 2001 as a band devoted to the more playful and evocative experimentation. CaboSanRoque crafts invented instruments that result from the recovery of everyday objects as diverse as sewing machines, washing machines, slot racing cars, staplers or disused furniture pieces. From this willingness of building musical machines and experimenting with the musical and scenic expressive properties of these mechanical devices, several shows and sound installations have been created along the years, such as Bestiari (Bestiary, shown now at TEI’13), El run-run delNyigo-Nyigo (with Pascal Comelade, Carles Santos, Pierre Bastien and Joan Saural), Maquinofobiapianolera (with Carles Santos), Torn de Nit, Música a màquina,La Caixeta, Los árboles aullaron (Fonoteca Nacional de México) or Pas de loup (La Capella, Barcelona). CaboSanRoque has also released five albums (CaboSanRoque, França Xica, Música a màquina, Ball de pistons, Maquinofobiapianolera). The group is currently integrated by Roger Aixut, Pepe Seguí, Laia Torrents and Oriol Luna.
Embodying Know-How: Does Motor involvement Promote Learning Outcomes in Science Education?
Wim Pouw, Erasmus University Rotterdam
Charly Eiots, Erasmus University Rotterdam
Tamara van Gog, Erasmus University Rotterdam
Rolf Zwaan, Erasmus University Rotterdam
Fred Paas, Erasmus University Rotterdam

effMeet: peripheral interaction design for meeting management
Sven van Ool, Eindhoven University of Technology
Elise van den Hoven, University of Technology Sydney, Eindhoven University of Technology
Saskia Bakker, Eindhoven University of Technology

Cognitive map formation through distal-to-tactile sensory substitution
Martina Lukowska, Jagiellonian University
Justyna Janik, EDISONDA
Krzysztof Kasparek, Jagiellonian University
Bartosz Majchrowicz, Jagiellonian University
Michał Wierzech, Jagiellonian University

PESI: Extending Mobile Music Instruments with Social Interaction
Nuno Correia, Aalto University
Koray Tahirıoğlu, Aalto University
Miguel Espada, Universidad Complutense de Madrid

Methods for Designing Tangible UI: A First Comparative Case Study
Céline Coutrix, LIG, CNRS
Guillaume Rivière, ESTIA
Katarzyna Borgiel, ESTIA
Julien Castet, Immersion SAS
Nadine Coutre, ESTIA, LaBRI
Brygg Ulmer, Louisiana State University
Jens Geelhaar, Bauhaus-Universität Weimar
Patrick Reuter, ESTIA, LaBRI
Naveed Takouachet, ESTIA
Christophe Kolski, LAMH, Univ. de Valenciennes
Sophie Lepreau, LAMH, Univ. de Valenciennes
Jérémy Légardeur, ESTIA
Sebastien Kubicki, Lab-STICC, ENIB
Yvonne Jansen, INRIA
Amira Bouadid, Univ. of Stax

TangibleTalk: Linking Spaces through Movable Tangible Interfaces
Taiki Uno, Waseda University
Martin Tomitsch, University of Sydney
Oliver Bovn, University of Sydney
Ingrid Pohl, University of Sydney

Studying Multimodal Interaction at an Interactive Museum Exhibit on SteamPower Locomotive
Loraine Clarke, University of Strathclyde
Eva Hornecker, University of Strathclyde

Tracing shared insight
Jelle van Dijk, Utrecht University of Applied Sciences
Remko van der Lugt, Utrecht University of Applied Sciences
Caroline Hummels, Eindhoven University of Technology

Getting Warmer: Identifying Population Stereotypes for Thermal Expression
David Barter, Simon Fraser University
Henry Lin, Simon Fraser University

Lasting Impression: Interaction With Embodied Puppet Leads to Changes in the Way People Draw Sketches
Ali Mazalek, Georgia Institute of Technology
Sanjay Chandrasekharan, Tata Institute for Fundamental Research
Michael Nitsche, Georgia Institute of Technology
Tim Welsh, University of Toronto
Paul Clifton, Georgia Institute of Technology
Fred Leighton, Georgia Institute of Technology

Beyond Actuated Tangibles: Introducing Robots to Interactive Tabletops
Sowmya Somanath, University of Calgary
Ehud Sharlin, University of Calgary
Mario Costa Sousa, University of Calgary

Mastering digital materiality in immersive modeling
Johann Habakuk Israel, Fraunhofer IPK

Using Stone in the User Interface Design – City Mouse Urban Media Installation
Jonna Häkkilä, University of Oulu
Olli Koskenranta, University of Oulu
Maaret Posti, University of Oulu

Body and Space: Combining Modalities for Musical Expression
Marco Donnarumma, Goldsmiths, University of London
Baptiste Caramiaux, Goldsmiths, University of London
Ata Tanaka, Goldsmiths, University of London

Tangible or Gestural: Comparing Tangible vs. KinectTM Interactions with an Object Manipulation Task
G Michael Poor, Bowling Green State University
Brianna J. Tomlinson, Bowling Green State University
Darren Guinness, Bowling Green State University
Lauri Marie Leventhal, Bowling Green State University
Guy Zimmerman, Bowling Green State University
Dale S. Klopfner, Bowling Green State University

User Test Design for a Sensitive Interactive Wall
Ingrid Pohl, University of Sydney

Dynamic Duo: Exploring Phone-Tablet Combinations for Mobile Usage
Tommaso Piazza, Chalmers University of Technology
Shengdong Zhao, National University of Singapore
Gonzalo Ramos, Microsoft Corporation
Asim Evren Yantaç, Chalmers University of Technology
Morten Fjeld, Chalmers University of Technology

TanRule: A Rule Editor for Behavior Specification on Tabletops
Patricia Pons, Universitat Politècnica de València
Alejandro Catala, Universitat Politècnica de València
Javier Jaen, Universitat Politècnica de València
10th Feb.

9:00-21:00 Registration
DHUB. ENTRANCE

9:00-10:30 Registration
FAB LAB BARCELONA

9:30-17:30 Studios
FAB LAB BARCELONA

9:30-18:30 Graduate Student Consortium
DHUB. Floor 1

19:30-21:00 Welcome Reception
DHUB. FOYER 4th floor

11th Feb.

9:00-17:30 Registration
DHUB, MAIN ENTRANCE

9:30-10:00 Opening Presentations
DHUB, AUDITORIUM 4th floor

10:00-11:00 Opening Keynote
DHUB, AUDITORIUM 4th floor

11:00-11:30 Coffee Break
DHUB 3rd floor

11:30-13:00 PS1: Physical Objective
DHUB, AUDITORIUM 4th floor

13:00-14:00 Lunch
DHUB FOYER 4th floor

14:00-15:30 PS2: Learning and Education
DHUB, AUDITORIUM 4th floor

15:30-16:00 Coffee Break
DHUB 3rd floor

16:00-17:30 PS3: Material World
DHUB, AUDITORIUM 4th floor

Design Challenge

17:30-19:30 UPF CAMPUS.SALA POLIVALENT

20:00-23:00 Concert Party
RAZZMATAZZ (Sala 2)

12th Feb.

9:00-16:00 Registration
DHUB, MAIN ENTRANCE

9:30-11:00 PS4: Cultural Perspectives
DHUB, AUDITORIUM 4th floor

11:00-11:30 Coffee Break
DHUB 3rd floor

11:30-13:00 Panel: The beauty of the paradigms encounter
DHUB, AUDITORIUM 4th floor

13:00-14:00 Lunch
DHUB FOYER 4th floor

14:00-16:00 PS5: Compare and Contrast
DHUB, AUDITORIUM 4th floor

16:15-19:45 Demos
FABLAB

20:00-23:00 Banquet by the Sea
RESTAURANT BESITIAL

13th Feb.

9:00-17:30 Registration
DHUB, MAIN ENTRANCE

9:30-11:00 PS6: Getting Mobile
DHUB, AUDITORIUM 4th floor

11:00-11:30 Coffee Break
DHUB 3rd floor

11:30-13:00 PS7: Gesture & Toolkits
DHUB, AUDITORIUM 4th floor

13:00-14:00 Lunch
DHUB FOYER 4th floor

14:00-15:00 PS8: Specific User Groups
DHUB, AUDITORIUM 4th floor

15:00-16:00 Closing Keynote
DHUB, AUDITORIUM 4th floor

16:00-16:30 Coffee Break
DHUB 3rd floor

16:30-17:30 TEI 2013 Closing Remarks
DHUB, AUDITORIUM 4th floor