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# Collaboration Meets Interactive Surfaces and Spaces (CMIS): Walls, Tables, Mobiles, and Wearables

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**Abstract**

The CMIS workshop proposes to bring together researchers who are interested in improving collaborative experiences through the combination of multiple interaction surfaces with diverse sizes and formats, ranging from large-scale walls, to tables, mobiles, and wearables. The opportunities for innovation exist, but the ISS, CHI, CSCW, and other HCI communities have not yet thoroughly addressed the problem of bringing effective collaboration activities together using multiple interactive surfaces, especially in complex work domains. Of particular interest is the potential synergy that one can obtain by effectively combining different-sized surfaces and sharing information between devices.

**Author Keywords**

Collaboration, interactive surfaces, large display walls, tabletops, mobile, multi-touch interaction, wearables.

**ACM Classification Keywords**

H.5.m [Information interfaces and presentation (HCI)]: Miscellaneous.

**General Terms**

Design; Human Factors

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**Figure 1:** Eery Space: a remote user controls the wall, two users in different physical spaces engage in a collaborative activity (indicated by the same color of their auras) and a fourth user looks at them through a virtual window.



**Figure 2:** Bancada: multiple users collaboratively exploring geospatial information space with an overview map displayed on a tabletop.

## Introduction

Large scale displays and interactive surfaces offer a unique visualization environment favorable to both individual and collaborative design tasks [4, 6]. During the last decade these devices have become both affordable and easier to setup, providing highly interactive environments with high resolution and support for stereoscopic images. Combined with emerging input devices, these provide new ways to interact with content as well as enabling new applications to support collaborative engineering tasks as well as many other activities [5].

Additionally, new devices have become available to enhance these interactions, including tablets combining several sensors [3], non-intrusive tracking solutions based on depth cameras, wearable devices, and other equipment. Despite this rapid technological advance, however, it still remains an unsolved problem how to bring effective collaboration capabilities to this myriad of heterogeneous interactive surfaces. This workshop aims at bringing together the most advanced techniques, user interfaces, and technological issues that are crucial in fostering co-located collaboration and remote communication between users across different facilities simultaneously [7].

Following the success of previous Collaboration Meets Interactive Surfaces (CMIS) workshops co-located at ITS 2013–2015 [1, 2], we propose to host another workshop at ISS 2016. In the 2015 edition of the workshop a total of 25 participants attended, in 2014 21 participants attended, and in 2013 27 participants attended. Participants exchanged experiences regarding collaborative user interface design and evaluation techniques involving interactive surfaces, in both remote and co-located settings. Some previous CMIS workshop papers discussed issues focusing on collaborative design space with proxemics [8] (see Figure 1),

geospatial interaction on tabletops [10] (see Figure 2), collaborative medical visualization on tabletops [11] (see Figure 3), and multi-user presentation software on large high resolution touch walls [9] (see Figure 4).

## Topics of Workshop

Topics of the workshop include (but not limited to):

- Design and evaluation of collaborative environments with interactive surfaces, either remotely or co-located;
- Collaborative applications on interactive surfaces for different domains (e.g. meeting rooms, 3D visualization, mechanical engineering, medical visualizations)
- Communication, cooperation and coordination as well as social protocols;
- Interactive surfaces to enhance spatial perception of content and support navigation during collaboration;
- Issues when moving from desktop-based collaboration to large-scale walls, tabletops, touch-based mobile devices, and wearables;
- Integration of different devices and surfaces (Walls, Tables, Mobiles, Wearables) for collaboration;
- Physical navigation between different devices;
- Collaboration paradigms and user interface designs that address enhancement of collaborative activities using interactive surfaces and tabletops;
- Collaborative sense making and visual analytics with different interactive surfaces and devices;
- Theories and applications of social science for interactive surfaces and devices.



**Figure 3:** SimMed: multiple students collaborating around a tabletop for medical training.



**Figure 4:** The Cube: running CubIT a large scale multi-user presentation and collaboration platform.

## Organizing Committee

The following people form the organizing committee:

**Craig Anslow** is a Senior Postdoctoral Research Fellow at Middlesex University, UK. His research interests include multi-surface environments for emergency management and criminal intelligence as well as engineering novel visual analytics applications.

**Pedro Campos** is an Assistant Professor at the University of Madeira, Portugal. His research interests include interaction design, augmented reality, natural interaction, and museums and cultural heritage.

**Laurent Grisoni** Laurent Grisoni is a Professor in computer science at University of Lille, France. He is also associated to CNRS and INRIA (MINT research group). His research interests include tactile and gesture-based interaction, in the fields of virtual reality and HCI.

**Andrés Lucero** is an Associate Professor at the University of Southern Denmark in Kolding. His research interests lie in the areas of mobile human-computer interaction, co-design, and design research.

**Mirjam Augstein** is a Professor for personalized and collaborative systems at the University of Applied Sciences Upper Austria in Hagenberg. Her research interests lie in the areas of adaptive systems, assistive technologies, interaction methods and techniques and collaboration support in interactive systems.

**Jim Wallace** is an Assistant Professor at the University of Waterloo, Canada. His research interests include health informatics, decision-making in healthcare, and interactive data exploration and analysis.

## Program Committee

The following people form the program committee:

- Alfredo Ferreira, University of Lisbon, Portugal
- Nick Graham, Queens University, Canada
- Uta Hinrichs, University of St Andrews, United Kingdom
- Kris Luyten, Hasselt University, Belgium
- Roberto Martinez, University of Technology Sydney, Australia
- Narges Mayhar, University of British Columbia, Canada
- Alexander Nolte, University of Bochum, Germany
- Ian Oakley, Ulsan National Institute of Science and Technology, Korea
- Alberto Raposo, Pontifical Catholic University of Rio de Janeiro, Brazil
- Luciano Soares, Insper Instituto de Ensino e Pesquisa, Brazil
- Theophanis Tsandilas, INRIA, France

## Planned Activities and Format

Table 1 outlines the proposed planned activities of the one-day workshop. In the first session we will have welcome and introductions by all attendees, followed by an invited talk. After the morning break the second session will have lightning talks of workshop papers from attendees. Lunch will follow to allow attendees to meet and mingle. In the third session attendees will split into groups based on themes related to the goals of the workshop. Once the groups have been formed discussions will happen amongst attendees and the groups will report back about this discussions. The fourth session will involve a group design activity based on the discussions from the previous session. Finally there will be some closing remarks from the organizing committee as well as feedback from attendees.

Time	Activity
0900–0930	Welcome and introductions
0930–1030	Invited Talk - Stacey Scott, University of Waterloo
1030–1100	<i>Morning Break</i>
1100–1230	Presentation of workshop papers (lightning talks)
1230–1400	<i>Lunch Break</i>
1400–1530	Split into groups based on themes: from the workshop and discuss
1530–1600	<i>Afternoon Break</i>
1600–1730	Group design activity Closing remarks from OC

**Table 1:** Workshop Activities

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