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# Collocated Interaction: New Challenges in ‘Same Time, Same Place’ Research

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**Abstract**

In the 25 years since Ellis, Gibbs and Rein proposed the time-space taxonomy, research in the ‘same time, same place’ quadrant has diversified, perhaps even fragmented. The goal of this one-day workshop is to bring together researchers with diverse, yet convergent interests in tabletop, surface, mobile and wearable technologies, and those interested in the social aspects of interaction, such as conversation analysis and ethnomethodology. These communities have matured considerably, and produced significant exemplars of systems, methods, and studies concerned with collocated interactions. Yet, new challenges abound as people wear and carry more devices than ever, creating fragmented device ecologies at work, and changing the ways we socialise with each other. In this workshop we seek to start a dialogue to look back as well as forward, review best practices, discuss and design paper-prototypes using the collocated design framework, to consider how we might address new and future challenges through collocated design practice.

**Author Keywords**

co-located interaction; face-to-face; design; CSCW.

**ACM Classification Keywords**

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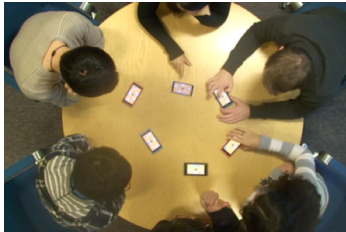


Figure 1: FlexiGroups explores multi-device binding for collaborative interaction.



Figure 2: Analysis of orderly ways in which situational uncertainty is managed in disaster response.



Figure 3: Work has identified territoriality in collaborative tabletop workspaces.

## Introduction

Since its early years of meeting room technologies [8], CSCW work in the 'same time, same place' quadrant of Ellis et al.'s time-space taxonomy [4] has diversified. For example, researchers have turned their attention from workplace settings to the home [20] and public spaces [19], and developed communities within testament of a diverse and active community, including at CSCW [22], ITS [1], MobileHCI [15], MAB [18], CHI [14], NordiCHI [12], and ECSCW [3,5].

Research concerned with collocated interaction has adopted diverse foci that chart a compelling socio-technical design space, with contributions ranging from technical solutions to in-depth studies of social interactions around technology. Technical contributions range from cross-device interaction techniques (Figure 1) [13] to fully integrated systems in complex, safety critical work settings [9], to the design and study of multi-device ecologies [25]. This work complements a long-standing tradition of systems design ethnography from early work studying London Underground control rooms [9], air traffic control [2], to disaster response (Figure 2) [7].

Furthermore, a range of naturalistic studies with ubiquitous computing technologies such as public displays [18], interactive tabletop (Figure 3) [21] and mobile phones [19], have been conducted with a goal to understand how they impact face-to-face interactions. This work often pays particular attention to the interactional resources people employ in face-to-face interaction, such as gaze, gestures, and bodily co-orientation, and its 'implications for design', such as how mutual observability of action may be a key resource for tabletop collaboration [10], how collocated

groups manage notifications by drawing on embodied resources [6], or how people coordinate and engage around public displays in social interactions [18]. One of the aims of this workshop is to bring together expertise and experience in these diverse domains to address new and future challenges in designing for collocated interaction settings.

## New Challenges

This workshop invites contributions across a range of topical interests to examine and collect exemplars of current and future challenges the CSCW community faces in collocated interaction research. Here, we only have space to briefly sketch two domains to exemplify the diversity of the research, although potential participants are encouraged to contribute challenges from their own collocated settings.

### *Collocated interaction in casual social settings*

In particular, the pervasiveness of mobile devices in everyday life raises challenging problems of societal scale. Public commentator Sherry Turkle tells us to 'stop googling, let's talk' [24], and elsewhere, she tells us about how phones socially isolate us from each other [23]. One of her interviewees captures the sentiment "Our texts are fine. It's what texting does to our conversations when we are together that's the problem".

While Turkle's and other public commentators' sentiment is captivating, it is but a sign of public concern that should motivate further research of face-to-face interaction involving technology. However, rather than sweeping generalisations and finger-pointing, our empirical research has the ability to paint a perhaps complicated, yet valid picture of how

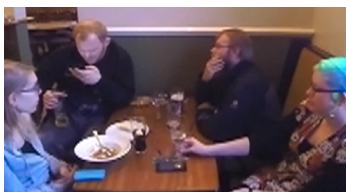


Figure 4: Identified practices of interleaving mobile device use with talk in collocated groups.



Figure 5: Work has captured the orderly use of how screens are used together in living rooms.



Figure 6: Study of mobile device notification co-management in collocated groups.

technology-enhanced social encounters really play out, in a multitude of settings including at work, at home, play, and travel. For example, in-depth ethnographic research has revealed the subtle and skilled ways in which we embed phone use in conversations in pubs (Figure 4) [19], living rooms (Figure 5) [20], and collaborative photo-taking (Figure 6) [6]. As Rooksby et al. [20] point out, “technology does not feature in the living room as something that brings or breaks intimacy, but rather mobile devices are things that enter an intimate environment and are used with respect to intimacy” (p.257).

#### *Collocated interaction in multi-device ecologies*

Multi-device ecologies have become common as people carry and wear more and more devices, and as our environments in which we travel, work, and play is becoming increasingly equipped with displays, projectors, and networked services, to name but a few. For collaborative teamwork settings, these ecologies can fragment team and task awareness [22], research points to the importance that personal displays are complemented with shared displays that provide a common reference point [25].

Ethnographic studies of collaborative work settings have also shown that members routinely work with assemblies of physical and digital resources, engaging in coordination and translation work to transfer information across the ‘seams’ of the resources (e.g. [7]). In their study of disaster response planning work, Fischer et al. found the (analogue) ‘bird table’ to be a sort of ‘common frame of reference’ for members to read progress and to align their own contributions (Figure 2) [7]. A challenge for CSCW designers wishing to support collocated work is then not just to focus on

the digital realm, but to what is done manually, by hand, and with physical objects.

In summary, the overarching goal of the workshop is to reflect on the insights of collocated interaction design research *across* these diverse domains. For instance, how can we leverage findings from studies of specific technologies (e.g. mobile phones, tabletops, or public displays) to understand the impact of overall technology ecology on face-to-face interactions? How can we build on these findings to design technology that stimulates and supports face-to-face interactions instead of hampering them?

#### **Themes**

For this workshop, we invite contributions (either posters or position papers) relating to the design and study of collocated interaction, including but not limited to any of the following:

- Studies of settings involving collocated interaction;
- Designs, deployments and studies of social/groupware and CSCW systems for collocated settings;
- Discussions of methods and tools to study and evaluate socio-technical systems with a focus on collocated settings;
- Examples and ‘thick descriptions’ of interaction and conversation analysis and ethnographic reports;
- Approaches and examples of how studies of face-to-face interaction inform design;
- Techniques of sensing ‘social context’, e.g. collocation, conversation, and bodily orientation;

- Concepts and design examples of systems that support collocated group-awareness and coordination;
- Explorations of interaction techniques aimed at supporting collocated interaction;
- Conceptual frames aiding the understanding of collocated interaction.
- Case studies and lessons learned from evaluating the impact of technology on co-located interactions.
- Studies or examples of mixed-presence CSCW systems.

### **Pre-Workshop Plans**

We will set up a dedicated website for announcements, communication, related work and accepted contributions. The call for participation will be distributed in relevant academic mailing lists related to CSCW and through social media. In addition, we will actively solicit submissions (via personal contacts and targeted invitations) from a broad range of researchers whose work relates to the workshop topic or who can make a significant contribution to the workshop. Attendance will be limited to 20 participants.

Potential workshop participants should submit a 3–6 page position paper (including references), *or* a poster and a 2-page abstract, describing their interest and/or previous work related to the workshop topic. All selected papers will be available online on the website prior to the workshop for consenting authors, and participants will be asked to read all accepted submissions ahead of the workshop to help ground the discussion.

### **On the Day**

The one-day workshop is structured into a series of different segments, each designed to encourage provocative and engaging interactivity through the exploration of a number of topics related to challenges within the field of collocated interactions. The first half of the workshop, the morning, will be devoted to getting to know each other and reflecting on existing and on-going work in collocated interactions. In order to ground later activities and acquaint attendees with each other, each participant will be asked to briefly present their position paper or poster to the group – this will be fast-paced and time-limited in relation to the number of submissions. The remainder of the morning will involve *mapping the design space* and key challenges through discussion of the submissions and related work (e.g. by affinity diagramming) to prepare the development of design ideas in the afternoon.

The remainder of the morning and most of the afternoon will be devoted to a hands-on ideation and prototyping session in small groups to develop design ideas related to the topics introduced by attendees. This will include the introduction of the collocated interaction design framework [16] to help facilitate ideation, while allowing participants to form novel concepts based on the existing challenges within the field identified in the previous session.

We will make use of the remainder of the afternoon to stimulate an active discussion and reflection based on the outcomes of the workshop activities. The purpose of this will be to answer key questions of the workshop, including how the CSCW community can adapt new approaches whilst building upon existing ideas to face current and future challenges within collocated

interactions. This outcomes of the day, including this discussion, will be recorded (with consent from participants) to allow for follow up activities. Concrete tangible outcomes of the interactive sessions of workshop will include a *map of the design space*, and *paper prototypes*. We seek to encourage follow up activities such as joint publications and workshops.

### **Organisers**

The organisers have recently co-organised a range of workshops that explored facets of collocated interaction [1,5,12,14,15,17,22]. In this workshop we seek to build on recent workshops by bringing together expertise in tabletop, mobile, and wearable technologies with social interaction research, to address new and emerging challenges in diverse CSCW domains from casual face-to-face settings to collaborative work environments.

**Joel Fischer** is an Assistant Professor at the School of Computer Science and a member of the Mixed Reality Lab at the University of Nottingham. His research focuses on understanding and supporting human activities and sense-making in collaborative real-world domains. He has co-organised workshops on collocated interaction at CHI, MobileHCI, NordiCHI and ECSCW. His research has been published at leading conferences in HCI (e.g. CHI, UbiComp, CSCW), and has received Best Paper Awards at CHI '13 and AAMAS '15.

**Martin Porcheron** is a PhD student in the Mixed Reality Lab at the University of Nottingham. His work has focused on the use of mobile devices within collocated groups. His research includes examining the social implications of mobile device use and the

positioning of mobile devices as resources that people can draw upon in conversations.

**Andrés Lucero** is an Associate Professor of interaction design at the University of Southern Denmark in Kolding. His recent work at Nokia focused on the design and evaluation of novel interaction techniques for mobile collocated interactions. He has recently co-organised successful workshops at ITS '13, CHI '15, and MobileHCI '15.

**Aaron Quigley** is a Professor in Human Computer Interaction in the School of Computer Science at the University of St. Andrews, where he is also Director for the HCI research group, SACHI. Aaron's research interests include surface and multi-display computing, human computer interaction, pervasive and ubiquitous computing and information visualization and has served on over 80 program committees and has been involved in chairing roles of over 20 international conferences and workshops.

**Stacey Scott** is an Associate Professor of Systems Design Engineering at the University of Waterloo in Canada. Her research focuses on human-computer interaction and computer-supported collaboration, with a special interest in developing technologies that enhance human-human interaction in face-to-face environments. She has been researching co-located collaboration technologies, including interactive tabletops and walls, and multi-surface systems, for over 15 years. She has co-organized five previous CSCW workshops (2000, 2002, 2004, 2006, 2015).

**Luigina Ciolfi** is a Reader in Communication at C3RI – The Cultural, Communication and Computing Research

Institute at Sheffield Hallam University. Her research focuses on technologies to support human interaction within the physical space, based on an understanding of the relationship between people, activities and their locales. She has organised a several international workshops (at venues such as ACM CHI, ACM CSCW and ECSCW) on topics from museum technologies and ubiquitous computing to mobile work. She is the author of over 80 peer reviewed publications in the human-centred computing domain, and has served in numerous service roles for international conferences.

**John Rooksby** is a Research Associate in Computer Science at the The University of Glasgow. His research focuses on everyday life, and how technology features within this. His recent work on co-located interaction includes video studies of photocopying and people watching television (published at CSCW and ECSCW respectively).

**Nemanja Memarovic** is a postdoc at People and Computing lab at the University of Zurich. His research focuses on how human interactions in public spaces may be enhanced through networked public displays. He has co-organised workshops on collocated interaction at NordiCHI '14 and at UbiComp '12 and '13, and he is a regular PC member for PerDis.

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