

# UbiMEET: Design and Evaluation of Smart Environments in the Workplace

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## ABSTRACT

This workshop is the fourth in a series of UbiComp workshops on smart environment technologies and applications for the workplace. It offers a unique window into the state of the art through the participation of a range of researchers, designers and builders who exchange both basic research and real-world case experiences; and invites participants to share ideas about them. This year we focus on understanding appropriate design processes and creating valid evaluation metrics for smart environments (a recurrent request from previous workshop participants). What design processes allow integration of new ubicomp-style systems with existing technologies in a room that is in daily use? What evaluation methods and metrics give us an accurate picture, and how can that information best be applied in an iterative design process?

## Author Keywords

Meeting support, smart conference rooms, design process, evaluation, augmented environments, multimedia, teleconferencing, user centered design, interactive furniture.

## ACM Classification Keywords

H5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous

## INTRODUCTION

The workplace, and in particular the smart conference room, is one of the places where real-world applications of ubiquitous computing are most highly developed. We believe that what is learned there in the domain of design for usability is relevant for the whole community. This year we focus on design issues for such augmented environments, and on the metrics of use and evaluation; a topic that participants in previous workshops agreed is crucial and where the evolution of a common set of guidelines is urgently needed to enable wider adoption and use of smart environment technologies.

## Design processes for smart environments

*Discovery:* First, it is necessary to understand and describe work context and activity (meeting types, solo or collaborative work, decision making, idea creation, and so forth). What methods are effective, and what existing research is of particular value? How do we categorize activity? [2] Different activities may call for different built systems; can we effectively set up common guidelines for the community? How do people know what to expect when they walk into a smart environment?

*Design processes:* The design of ubicomp for the workplace requires integrating devices, systems, and rules of practice. How do design processes change with the technologies for smart environments? Workplaces use a mesh of continuously evolving technologies: How can we design for continuous updates, devices from multiple vendors, as well as compatibility issues? What design methods can account for these and similar constraints?

## Evaluating smart meeting environments

A smart meeting environment requires investment. It is important, then, to perform evaluations in order to understand their everyday use as well as how they impact specific groups as well as the organization at large. Evaluation is also a critical first step in integrating the design of a smart environment. However, several barriers can stand in the way of effective evaluations. As work on metrics for ubicomp evaluations has shown [1,3], standard effectiveness, efficiency, and satisfaction metrics are important, but many other issues loom large. It is important also that users are not too distracted by all of the capabilities of a smart environment that they find it difficult to complete simple tasks. It can also be problematic to measure the effectiveness of collaborative interactions. Furthermore, it is necessary to understand the extent to which users feel in control of their environment and how well the space responds to their actions? Users also need to understand how the space adapts to their customization preferences. Finally, understanding impact is important: Is the new space accepted, and to what extent does it change users' behaviors or even the behaviors of the entire organization?

## Workshop format, activities, goals, scope

*Format:* Focus will be on discussion and idea sharing, rather than presentation. We will start with a round-robin introductory session (a couple of minutes per participant),

immediately followed by a subset of invited panels, demonstrations and/or short talks on workshop sub-topics, which will serve as provocations and points of departure for later discussion.

*Activities:* We will begin with brief reviews of and remarks on salient research; a few lightning demos; discussions (alternating between breakout teams to identify and classify areas of interest, and larger whole-group discussions) and finally proceed to a collation of ideas. The session will also provide a quick “state of the art” overview to participants.

*Goals:* We will focus on the recurring theme of design process and evaluation metrics for smart environments, with the goal of better understanding the iterative relationship between these. By beginning to develop a conceptual framework for commonalities in these areas, we may outline a set of guidelines or standards for designing and evaluating smart environments, particularly next-generation conference rooms.

*Scope:* The scope of interest includes but is not limited to (in no particular order): design processes for augmented environments and smart conference rooms, integrating mobile devices into smart environments, tools and applications to support augmented environment design, the roles of sensing and context awareness (particularly in metrics), and evaluation metrics and methodologies for conference rooms and other smart environments.

### **Organizers of the workshop**

We are a deliberately diverse group, drawing from several disciplines (computer science, electrical engineering, business systems, smart room hardware/software design, social science, and interactive architecture/design) and cultures (Japan, US, France, Canada). All of us have been working in aspects of ubiquitous computing, and smart meeting rooms in particular, for many years in both academia and industry.

**Maribeth Back** is a senior research scientist at FXPAL, and heads the Immersive Collaboration Environments project, focused on mixed-reality workplaces. She has worked on a number of smart environment systems as well as mixed reality projects at Xerox PARC, MIT Media Lab and Harvard Graduate School of Design. **Saadi Lahlou** is a social psychologist who heads the Laboratory of Design for Cognition at EDF R&D, a user laboratory in a large end-user organization that pushes the state of the art and fosters dissemination. He is the coordinator of the rufae (research on user-friendly augmented environments) network. **Masatomi Inagaki**, is a technology planner who heads the smart environment design team in Fuji Xerox’s ubiquitous technology area. Currently, his work is focused on designing next-generation workplaces for effective and creative collaboration. **Kazunori Horikiri**, is a senior architect at Fuji Xerox with expertise in ubiquitous computing and distributed computing. Currently, his work is focused on designing computing-embedded workplaces that enable knowledge workers to achieve effective and

creative collaboration. **Scott Carter** is a research scientist at FXPAL. He has developed several ubicomp technologies, including peripheral displays and capture and access systems. **Gerald Morrison** is Director of External Research for SMART Technologies. Previously he was a Senior Development Engineer and Manager – Image Processing for SMART.

### **Soliciting Participation**

We will strive to attract diverse viewpoints, including people from different cultures, research areas, and disciplines, while maintaining a cohesive line of inquiry throughout the workshop. We hope to engage people with expertise in smart environments for the workplace, multimedia communication, ubiquitous display systems, user-centered design, evaluation methods, and mobile and ubicomp applications; and to draw engineers, researchers, and designers from both industry and academia.

We will post a web site at <http://www.fxpal.com/UbiComp2008/> to describe the workshop. The site will be linked from each of our organizations' web sites. We will also distribute flyers at appropriate related sites, post to email lists, and directly solicit potential attendees.

### **Selection of workshop participants and presentations**

will be based on refereed submissions. Authors are invited to submit a 1-2 page position statement describing their interest, experience or ongoing research in the field, and including a brief biography. Position statements should have only one author, and admission to the workshop will be for that person only. Position statements should be sent directly to [back@fxpal.com](mailto:back@fxpal.com) and will be published on the website. We would like to cap the workshop at about 20 participants (including organizers). Both the number of informal queries we’ve already received about a workshop this year and the depth of response to previous workshops reveal considerable continued interest in the topic, and we believe that entry will be competitive.

### **Expected outcome of the workshop**

One objective of this workshop is to form an ongoing framework for smart environment evaluation metrics. This includes writing a collective paper proposing metrics for understanding the use of augmented rooms, with the aim of publication in a major journal. We are also considering a special issue focused on this topic, pulling “best of” work from all four years of the workshop.

### **REFERENCES**

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