

**CIS 677 Knowledge-Based Interfaces**  
**Topic “Ambient Interfaces”**  
**Spring 2004**  
**Syllabus**

**Keywords:** context-aware, ambient interface, invisible interface, transparent interface, augmented reality, pervasive computing

WEEK 1

**Rooms/Architecture as Interface**

Tuesday, March 30, 2004

ambientRoom Project

MIT Media Lab

Hiroshi Ishii

<http://tangible.media.mit.edu/projects/ambientROOM/ambientROOM.html/>

Building on Tangible User Interfaces, Ishii created ambientRoom.

**Paper 1 [Architecture: brave-CHI98.pdf] and video in CHI '98**

Ishii, H., Wisneski, C., Brave, S., Dahley, A., Gorbet, M., Ullmer, B. & Yarin, P. (1998). ambientROOM: Integrating ambient media with architectural space (video). Extended Abstracts of CHI'98: Conference on Human Factors in Computing Systems, 173-174.

The Everywhere Displays Project

IBM Research

<http://www.research.ibm.com/ed/>

The Everywhere Displays project aims to develop systems that allow the transformation of every surface in a space into a projected "touch screen". We are developing a prototype where we combine a LCD projector, a pan/tilt mirror, and a camera. The mirror is used to deflect the image of the projector to surfaces, walls, or the floor of a room. We process the projected image to compensate for the perspective distortion. We employ a pan/tilt video camera to detect hand/body activity on the projected area, so people can interact with the projected image by simply touching the surface.

Multiple papers are available.

Thursday, April 1, 2004

**Paper 2 [ARCHITECTURE IBM: 1-interact03.pdf]**

“Embedding Interactions in a Retail Store Environment: The Design and Lessons Learned”, Noi Sukaviriya, Mark Podlaseck, Rick Kjeldsen, Anthony Levas, Gopal Pingali, Claudio Pinhanez. *Proc. of the Ninth IFIP International Conference on Human-Computer Interaction (INTERACT'03)*. Zurich, Switzerland. September 2003

[Architecture: brave-CoBuild'98.pdf]

Wisneski, C, Ishii, H., Dahley, A., Gorbet, M., Brave, S., Ullmer, B. & Yarin, P. (1998). Ambient displays: Turning architectural space into an interface between people and digital information. Proceedings of CoBuild'98: First International Workshop on Cooperative Buildings, 22-32.

Tuesday, April 6, 2004

**Paper 3 [Architecture: hebb-csw02.pdf]**

Carter, Scott, Mankoff, Jennifer and Goddi, Patrick. (2002) "Representing and supporting action on buried relationships in smart environments." CSCW 2002 Workshop Paper.

Examples on campus:

Lillis Business classrooms

WEEK 2

Tuesday, April 6, 2004

**Support for disabled users**

**Paper 4 [Disabled: 469-ho-ching.pdf]**

Jennifer Mankoff at UC Berkeley CS Dept.

Ho-Ching, F. Wai-ling, Jennifer Mankoff, James A. Landay, (2003). "From Data to Display: the Design and Evaluation of a Peripheral Sound Display for the Deaf." In Proceedings of CHI 2003. 8 pages.

Thursday, April 8, 2004

Tour of Lillis classroom

WEEK 3

**Performance art:**

Electronic Performance Workshop, NYU, Jon McKenzie, May 21-June 27, 1996

<http://www.nyu.edu/classes/mckenzie/SLep1syll.html>

StudioLab, NYU, Jon McKenzie

<http://www.nyu.edu/classes/mckenzie/>

Andruid Kearne and Melissa Lang (initially at NYU, Kearne now at Tufts)

Critical Arts Ensemble's Electronic Disturbance and Phil Auslander's Presence and Resistance.

Allucquere Rosanne Stone's "Virtual Systems," David Tomas' "Old Rituals for New Space," Félix Guattari's "Regimes, Pathways, Subjects," and Pruitt and Barrett's "Corporate Virtual Workspace."

Christian Moeller

Media Artist, Los Angeles

Conference Chair, Professor at the Department of Design Media Arts at UCLA  
Christian Moeller's light installations, audio sculptures and his interactive works  
have been extensively shown in Europe and Japan.

<http://www.christian-moeller.com>

Rafael Lozano-Hemmer

Electronic Artist, Madrid/ Montreal

He is artist in residence at the Institute for Research in Construction of the  
Canadian National Research Council.

Developer of large-scale interactive installations in public space, usually  
deploying new technologies and custom-made physical and virtual interfaces. He  
coined the term "Relational Architecture" to name the series of interventions that  
he has been designing and presenting for the past ten years in cities in Europe,  
Asia and Latin America.

<http://www.lozano-hemmer.com>

"The Lightwork Performance: Algorithmically Mediated Interaction for Virtual  
Environments" John Bowed, Sten-Olof Hellstriim' Kai-Mikael Jgiii-Are'  
'Centre for User-Oriented IT-Design (CID), Royal Institute of Technology (KTH),  
Stockholm, Sweden CHI 98 .18-23 APRIL 1998 [Performance Art: LightWork-p291-  
bowers.pdf]

"Murmuring Field"

Staging the space of mixed reality—reconsidering the concept of a multi user  
environment. Wolfgang Strauss, Monika Fleischmann, Mette Thomsen, Jasminko  
Novak, Udo Zlender, Thomas Kulesa, Frank Pragasky. February 1999,  
Proceedings of the fourth symposium on Virtual reality modeling language.  
[Performance Art: MurmuringField-p93-strauss.pdf]

Collaboration in Virtual Environments: Audience interaction for virtual reality  
theater and its implementation. Sang Chul Ahn, Ig-Jae Kim, Hyoung-Gon Kim,  
Yong-Moo Kwon, Heedong Ko, November 2001, Proceedings of the ACM  
symposium on Virtual reality software and technology. Korea theatre. Audience  
interaction [Performance Art: Korea-p41-ahn.pdf]

WEEK 4

### **Technological implementation**

**Paper ?? [ARCHITECTURE IBM: 5-icvs03.pdf]**

Dynamically Reconfigurable Vision-Based User Interfaces

Rick Kjeldsen, Anthony Levas, Claudio Pinhanez

BEST PAPER AWARD

In: 3rd International Conference on Vision Systems (ICVS'03). Graz, Austria.  
April 2003

**Paper ?? [ARCHITECTURE IBM: 6-percom03.pdf]**

Steerable Interfaces for Pervasive Computing Spaces

Gopal Pingali, Claudio Pinhanez, Anthony Levas, Rick Kjeldsen, Mark Podlaseck,  
Han Chen, Noi Sukaviriya

Mark Weiser BEST PAPER AWARD

In: IEEE International Conference on Pervasive Computing and Communications  
- PerCom'03. Dallas-Fort Worth, Texas. March 2003

Hong, J.I. The Context Fabric: An Infrastructure for Context-Aware Computing.  
In Proceedings of Doctoral Consortium, Human Factors in Computing Systems:  
CHI 2002. Minneapolis, MN 2002. [Context: hong-CHI2002-confab-final.pdf]

Hong, J.I. and J.A. Landay, An Infrastructure Approach to Context-Aware  
Computing. Human-Computer Interaction (HCI) Journal, 2001. 16(2-3). [Context:  
hong-context-essay-final.pdf]

WEEK 5

No class

WEEK 6

**Interface/Interaction issues**

Gesture recognition, TUIs

Need to find some papers

WEEK 7

**Context-Awareness:**

Abowd, G.D., C.G. Atkeson, J.I. Hong, S. Long, R. Kooper, and M. Pinkerton,  
Cyberguide: A Mobile Context-Aware Tour Guide. ACM Wireless Networks  
1997. 3(5): p. 421-433. [Context: hong-acm-winet-cyberguide-submit.pdf]

WEEK 8

**Information Agents:**

Hong, J.I. and J.A. Landay, A Context/Communication Information Agent.  
Personal Technologies (Special Issue on Situated Interaction and Context-Aware  
Computing), 2001. 5(1): p. 78-81. [AI: hong-personaltech2001-cia.pdf]

WEEK 9

**Ethical issues: Privacy**

Jason Houg UC Berkeley CS Dept. "Context Aware Computing Ethics" See  
Winograd's course

<http://hci.stanford.edu/cs547/abstracts/03-04/040305-hong.html>

Hong, J.I., J. Ng, S. Lederer, and J.A. Landay. Privacy Risk Models for Designing Privacy-Sensitive Ubiquitous Computing Systems. Submitted to Designing Interactive Systems (DIS2004). August 1-4, 2004. Boston, MA. To Appear 2004.

[ARCHITECTURE IBM: 7-ijhcs02.pdf]

BlueSpace: Personalizing Workspace through Awareness and Adaptability, by Jennifer Lai, Anthony Levas, Paul Chou, Claudio Pinhanez, Marisa Viveros; International Journal of Human Computer Studies vol. 57(5): 415-428. 2002

## Resources

### Conferences:

#### Invisible & Transparent Interfaces 2004

Part of Advanced Visual Interfaces (AVI 2004)

May 25, 2004, Gallipoli, Italy

Contact Steve Tanimoto at CS Dept. Univ of Wash

<http://ole.cs.washington.edu/iti/>

This workshop focuses on the dual stranded research themes of "invisible interfaces" and "transparent interfaces" for ubiquitous and intelligent computing environments. These strands are woven together by complex inference models and methods and how the use of such models affects the end-user experience. Transparent interfaces allow end users to understand and access the context, inferences, decisions, and personal attributes that the underlying intelligent processes are basing their decision processes on. Such interfaces are increasingly important in applications such as learning tools, information retrieval facilities, and intelligent help systems. Invisible and ambient interfaces consist of natural environments instrumented to accept user action in the form of human motion, activity, sound or day-to-day devices that allow for seamless human computer interaction.

#### IDCA ambient:interface

August 25-28, 2004

<http://www.idca.org/>

Software not only changes how design works, more importantly it changes how design thinks. The logics of computation and the languages of the interface transform one practice into another: cinema into architecture, product design into philosophy, urban planning into advertising.

Across the ":" in "Ambient : Interface" a two-way conversion is at work. Interfaces don't just perform on screens, they also contextualize their lived, physical locations: interfaces are a kind of architecture. Simultaneously, design must begin from an appreciation of

how people connect locally and at a distance through physical objects and systems: the material cultures in front of us are themselves interfaces.

IDCA 2004 will assemble several of the world's most important designers and design theorists to consider several interrelated questions:

--How has interface driven software impacted the conception of complex environments?  
--How does architecture function as an interface through which we experience the social world?

--How do media embedded in the designed surfaces of the world refocus attention on the interconnected fabrics of our lives?

--How do the languages of software transform global design culture in their image? How do they create new compulsions and criteria of beauty, function and accountability?

### CHI 2004 Conference on Human Factors in Computing Systems

<http://www.sigchi.org/chi2004>

Vienna, Austria

Ambient Intelligence (AI) is a major funding area of European Community computing research activities for the next ten years and a major theme of the CHI Conference this year. Some associate AmI with "user-friendly information and services anywhere and anytime," others with "digitally empowered smart everyday objects and physical environments." Still others relate it to the anticipated cross-fertilization of three emerging technology fields: (a) ubiquitous computing, (b) wireless and ubiquitous communication, and (c) intelligent multimodal user interfaces. Regardless of which perspective is preferred, AmI has a special focus on interface and interaction design. The purpose of the Ambient Intelligence Special Area is to showcase the diversity of AmI research contributing to the implementation of the AmI vision. Examples are the Disappearing Computer Initiatives I and II. CHI2004 aims to shed light on the question of how HCI techniques can help to understand and shape the AmI era. This will help to make the implications and relevance of HCI work explicit to people and initiatives in the emerging AmI domain.

Examples on campus:

Knight Library entrance: Stollet's music

Guest speakers:

Someone from architecture school here

Colin Ives from Multi-media program (Art Dept)

[http://mmd.uoregon.edu/colin\\_ives.html](http://mmd.uoregon.edu/colin_ives.html)

Jeff Stollet from Music School

<http://music.uoregon.edu/About/bios/stoletj.html>

Building manager for Lillis Frank Sharpy 6-4794

**Broader Reading**

Jeffrey M. Bradshaw, *Software agents*, MIT Press, Cambridge, MA, 1997

Hagsand, O. Interactive multiuser VEs in the DIVE system. *IEEE Multimedia*, 3 (1), 1996