
Responsive Surfaces

The design challenge of ambient information

Position

- Provocation:* What does architecture do in an age of information glut? How can design approach this question both technically and critically? When other, more ephemeral media clearly win any competition for visual attention, how does architecture operate in the background, habitually, in a state of distraction? And what does it mean to design, build, or inhabit in an age of unprecedented distraction? How can the design of information-laden objects and environments reawaken or bring critique to an age of gizmos, downloads, and feeds? How is ubiquitous computing not just a universal portable device, a one-size-fits-all, anytime-anywhere erosion of space and place?
- Topic:* This workshop should help you understand the design challenge of ambient information. Here you will get a chance not only to review recent theory and works, but also to build some hands-on skills. In this experimental offering in the College, you have a chance to become an innovator at what has quickly shaped up as an important complement to related movements in digital fabrication or scripted form, namely physical computing.
- Movement:* Physical computing studios are by now widespread in schools of art and media studies; and the time is right to translate this work into architecture. The embedding of sensors, actuators, tags, and memory into the built environment has accelerated in recent years. In the process, the means for artists and non-programmers to experiment in this field have become much more affordable and usable.
- History:* Architecture has always been inscribed, with everything from imperial proclamations to advertising and graffiti. Twentieth century “media” brought a particular flavor to these cultural practices, especially through the addition of electrical layers to the built environment. Twenty-first century information infrastructures have become much more ambient, diversified, interactive, and social, of course; yet the theories by which the architecture academy operates often remain those of the mid twentieth century, particularly the 1960s. How does pervasive computing change any of that?
- Technique:* Exposure to the basics of electronics and interactivity could be considered a part of any general education. It might change how you see technology.
- Discipline:* What is the relationship of architecture to interaction design? Interaction design has become to the age of ambient information what industrial design was to the age of the mass-market machine. Both disciplines study how people deal with technology. Both care about interfaces. Interaction design goes beyond usability, however, in its concern for intent. In other words, it studies not just how efficiently a design operates, but what it suggests to do. Notions of psychological affordance, social convenience, and the bias of media become more prominent. Cultural positions become more important. A culture of criticism becomes necessary.

Course Organization

Format This is an experimental course with an open workshop format. Much of our session time will be devoted to helping one another with projects. Participants will work to bring one another up to speed on recent works, available technologies, and worthwhile applications. Tutorials will explain basic principles of electronics, and will demonstrate practical technologies. A research & criticism component will be useful toward developing a cultural stance, but this is not a scholarly course nor an established curriculum. Weekly sessions will mix all of these.

Requirements

- 1) A working project in the introductory technology, Scratch, using motion and images.
- 2) A first project in the Arduino technology, using motion and LEDs.
- 3) A final project in the Arduino technology, installed as an exhibition.
- 4) A thematic piece of research and criticism on recent work in responsive surfaces, with seminar presentation in two stages, and an associated web page.

Technology The course will use two stages of technology to encourage successful experience by everyone. While both of these have been selected for ease of access and learning, the first, called Scratch, is a children's platform for learning interactivity, that happens to have a physical board that can use sensors to drive onscreen output on your computer. The second, called Arduino, is an output controller board that can work with your computer or stand alone. You can load a script onto it, embed it into an installation, and reuse it afterward. Arduino has become the standard in for coursework in electronic art and physical computing, so there are ample learning resources online. Thus there are no canned labs in this course: you can own these boards and build with them as you wish.

Surfaces The course emphasizes surfaces, more than sculptural form, because surfaces have always been the main context for symbols. The final project is to be a 16 inch square installation in a fixed wall.

Semester Calendar

- Week 1* (12 January)
Introduction
- weekly:* Inscription and markup. Seminar presentations of research and criticism on the history and criticism of ambient information.
- Weeks 2-5* (19 January– 9 February)
Interactivity
- laboratory:* Basics of input and output. Visual script-building. Weekly learning stages.
- technology:* Scratch
- self-guided:* No class 19 January. Begin Scratch tutorials online.
- project 1:* A first sensate display wall
- Week 6* (16 February)
Critique
- seminar:* First stage presentations by all on cultural research & critique
- Weeks 7-9* (2, 9, 16 March)
Electronics
- laboratory:* Do-it-yourself electronics studio culture.
- technology:* Arduino, rangefinder inputs, LED outputs
- project 2:* A first physical installation
- project 4:* Research/critique presentations, 2 per session.
- Weeks 10-14* (23 March – 13 April)
Installations
- laboratory:* Survey of physical inputs and outputs and their engineering principles.
- technology:* Arduino + selected inputs and outputs
- project 3:* Final project installation
- project 4:* Research/critique presentations, 2 per session.
- Week 15* (20 April)
Exhibit

Processors

Scratch: <http://scratch.mit.edu/pages/scratchboard>

Arduino: <http://www.arduino.cc/>

Books

Philosophical: Adam Greenfield. 2007. *Everyware*, Berkeley: Peachpit Press.

Technical: Dan O'Sullivan and Tom Igoe. 2006. *Physical Computing*, University of Chicago Press.

Manual: Forrest Mims. 2000. *Getting Started in Electronics*. Lincolnwood, IL: Master Publishing.

Materials

Most useful components should be obtainable at a nearby Radio Shack or online, such as at SparkFun. The group may elect to make a shared purchase of some items.

Guides

TCAUP Visiting critics Jason Johnson and Marc Fornes both have related experience and may stop in.

A&D Michael Rodemer has done this related work years. He may visit us, and show devices and projects.

NYU Tom Igoe has many resources at: <http://tigoe.net/pcomp/>

Arduino Learning resources are in abundance at <http://www.arduino.cc/>