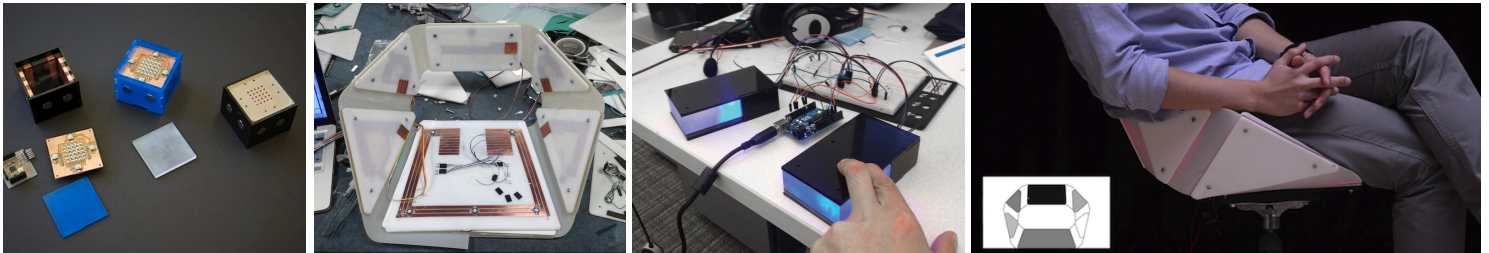


CONNECTIVE ENVIRONMENTS I

Human-Building-Human Interactions

ARCH 6307/4050, ITIS 6010, ITCS 5010: Tuesdays/Thursdays 1:00pm-2:15pm

Dr. Dimitris Papanikolaou / dpapanik@uncc.edu / Urban Synergetics Lab / Office: Storrs 146



PREMISE

What if the built environment could intelligently sense and mediate our human interactions? This course introduces design, prototyping, programming, fabrication, and evaluation of interactive objects, systems, and interfaces that enable interactions with and through the built environment. Through a project-based approach, students will explore how information technology, human behavior, and material or physical constraints, enable novel affordances, and how these affordances drive engineering design decisions for closing the loop between information and action. Project examples include: tangible human-building interfaces, interactive structures, programmable assemblies, connected interactive furniture, augmented building materials.

OBJECTIVES

Provides foundational skills in designing, prototyping, and programming of interactive physical computing systems. Students will learn how to: conceptualize, present, and critique designs in a studio format; design, prototype, assemble, program, and assess interactive physical or mechanical systems; review state of the art literature in HCI/HBI and write a paper for a conference. Emphasis is on critical thinking and tradeoffs between technical complexity, end goals, design decisions, functionality, and quality of craft, when humans are part of the loop.

TOPICS

Mechanical assemblies; human-in-the-loop systems; interactive embedded systems; tangible, embodied, and embedded interfaces; programmable materials; network communications; serial input-output; data visualization.

METHOD

The course combines lectures, lab assignments, readings, and student presentations, and is organized into four team projects and one final paper. Each student will develop a website to document projects and weekly progress. Class meets twice per week and has one lab session (TBD). Lab assignments introduce core technologies. Final project integrates skills critically in a real architectural context that engages one or more individuals to interact with/through it. Final paper will be of publishable quality at the level of the ACM SIGCHI [TEI](#), [DIS](#), or [ACADIA](#) conferences (short paper or project category).

PARTICIPATION

Cross-listed and open to G/U students in Architecture, Software and Information Systems (SIS), and Computer Science (CS).

PREREQUISITES

Students are expected to have basic 3D modeling and fabrication skills (Rhino/Grasshopper/CNC/laser cutting/3D printing), and familiarity with the Arduino board and programming language (there are plenty available tutorials online and Arduino starter kits in SOA).

SCHEDULE (MILESTONES)

Weeks 01-02: Basics of engineering design and mechanical assemblies (Website Development & Mechanically Actuated Toy)

Weeks 03-05: Basics of machine logic and computation theory (Analog Computing Device)

Weeks 06-09: Basics of sensors, microcontrollers, programming, electronics (Interactive Artifact/Physical Interface)

Weeks 10-16: Basics of communications, internet, databases, data visualization (Connective Artifact/Physical Interface)