

CS8803-PP Physical Prototyping for HCI



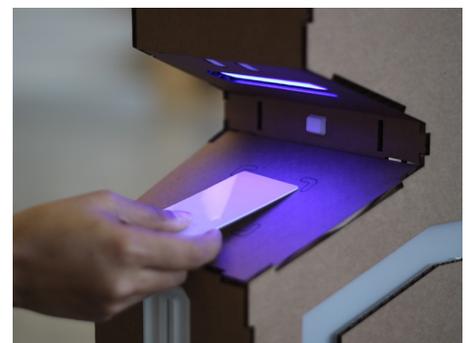
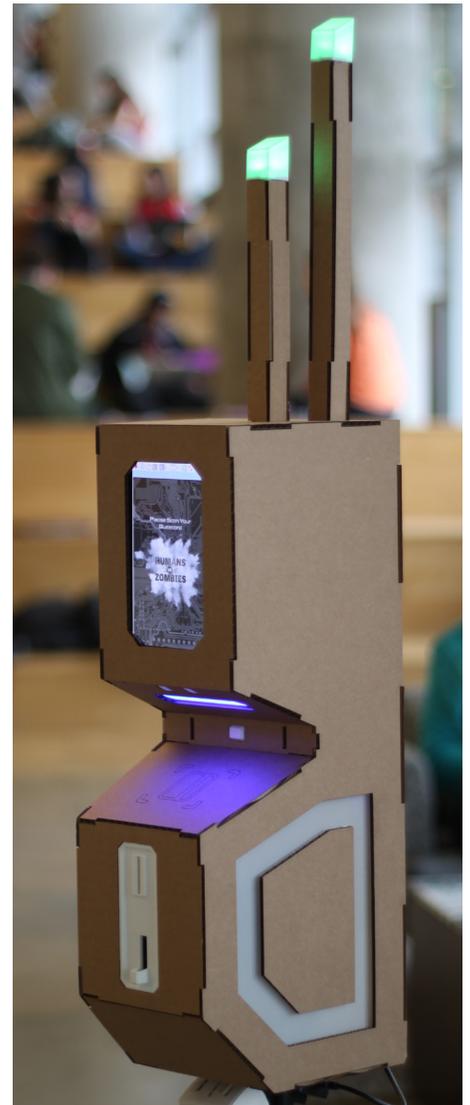
Course Description

This course aims to expose and provide students with hands on experience with the tools and techniques needed to create 3D physical product design and interaction prototypes. Students will progress through the model making process gaining experience and exposure to traditional model making techniques, rapid prototyping technologies, and an understanding of where and when it fits into the design process. Students will also learn methods for incorporating interactive elements and hardware into physical models to allow for testing.

Learning Objectives

Upon completion of the course students are expected to demonstrate knowledge, skill and abilities in the following areas:

- Communicate an idea visually in 2 and 3 dimensions.
 - Develop physical hand built models through an iterative process
 - Produce models using several rapid prototyping technologies
 - Produce evidence of documentation of the model making process
- Recommend the most effective type of model to communicate a desired concept
- Critique the work of yourself and others in a constructive manner
- Evaluate the intended interaction and functionality of a design using a physical model
- Incorporate existing components into digital and physical models.
- Identify and execute Craft, with a capital “C” (Craft: the level of quality executed during all steps of the process which is visual and process oriented)



Course Format

This course is taught utilizing multiple methods. These include lecture topics (such as those shown here), in-class discussions, in class reviews of work from both peers and external professionals, workshops and demonstrations of skills and techniques, and video demos of software.

Introduction to CAD

CS 8803: Physical Prototyping for HCI

Introduction to Laser Cutting

CS 8803: Physical Prototyping for HCI

Sketch Models and Iterative Modeling

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Interaction Models

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Modeling Existing Components

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Introduction to 3D printing

CS 8803: Physical Prototyping for HCI

Design for 3D printing

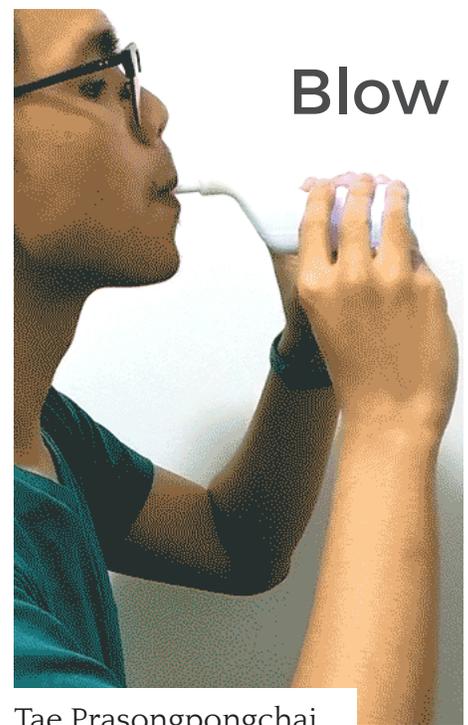
CS 8803: Physical Prototyping for HCI



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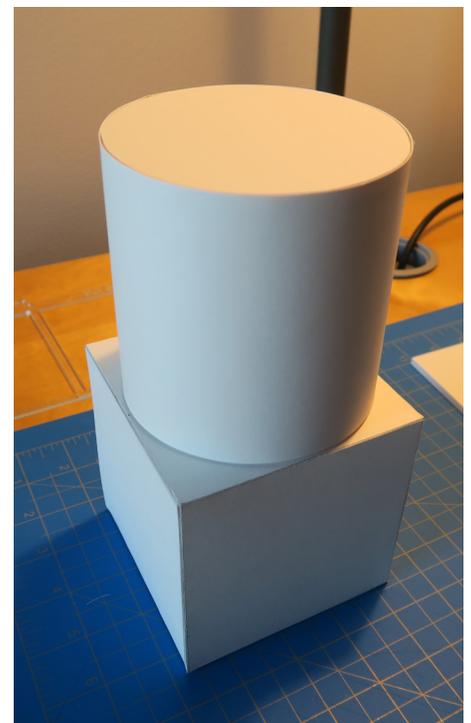
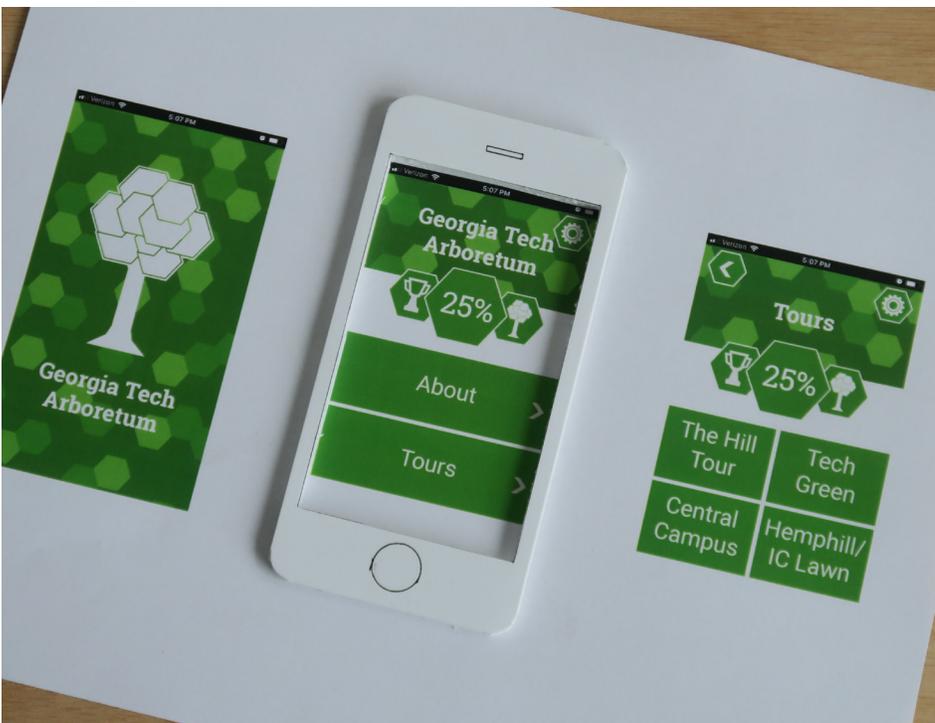
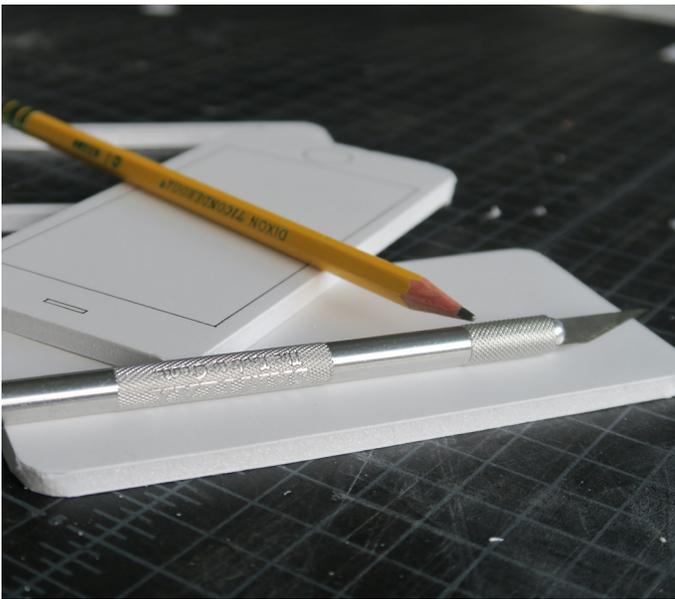
Ruchita Parmar



Tae Prasongpongchai

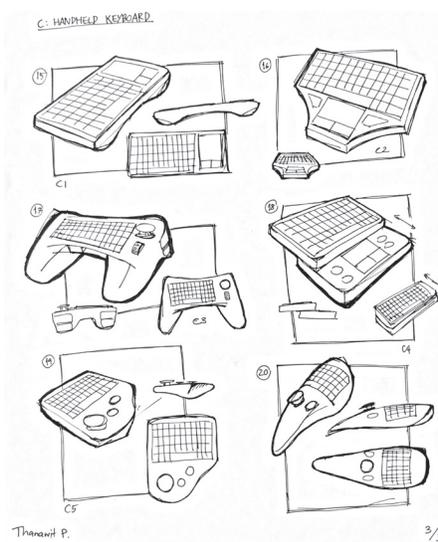
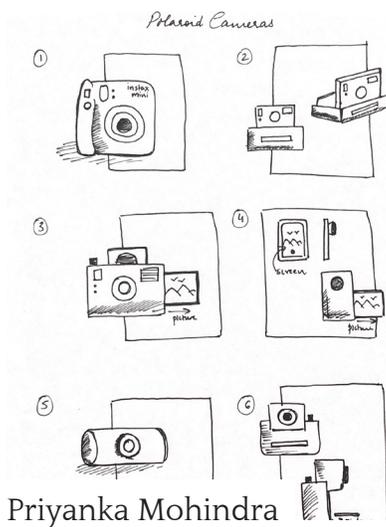
Project 1: Knife Skills and Craft

One of the most common, low cost, and easily available methods for prototyping is desktop modeling. These models are usually made from paper or foamcore and are used to spark discussion, show general form, or represent a concept. This project gives students practice creating something physical and provides them experience working with foamcore and an x-acto knife. During this assignment students focus on perfecting craft and creating clean well cut edges and well drawn lines.



Project 2: Iteration in Foam

Iterative model making is one of the most important tools that can be used in form development. In iterative model making each model informs the next. The progression between each model and the intent of the designer can be clearly seen and followed. Working in low weight foam allows for models to be made cheaply and quickly. Although resolution is sacrificed, the ability to quickly move through ideas in 3D allows designers to test, refine, and stumble across ideas and forms. Working in a physical medium also constrains designers to the real world more than sketching provides. This type of fast foam modeling is the three dimensional equivalent to sketching. Hence these models being referred to as sketch models. In this project students start with one design and then iterate off of it creating a series of models. Students gain an understanding of how and what to vary in a design, and what they can learn from each iteration. Students should work fast and not anguish over each model.



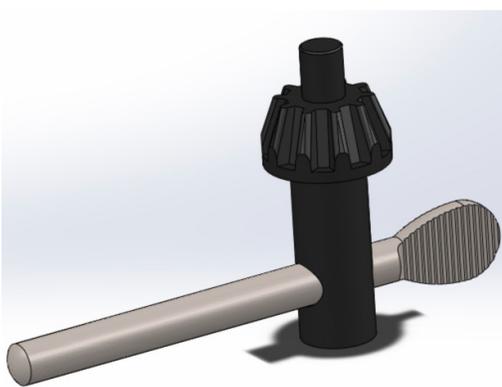
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Noah Posner

Project 3: Introduction to CAD

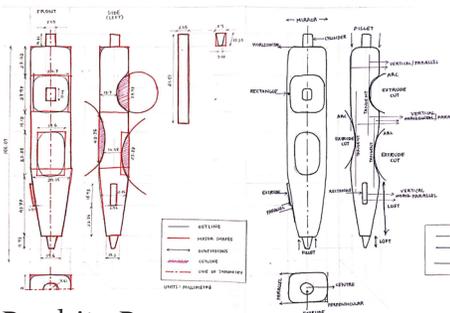
Taking a design from the physical realm into the digital one without losing intent can be one of the most challenging tasks for designers, but this skill opens many doors in the prototyping process. In order to be successful with this process one must understand the software they are working in. In this project students learn how to model in a feature based modeling software. Students model both existing objects and objects of their own design while learning how to address issues and troubleshoot difficulties.



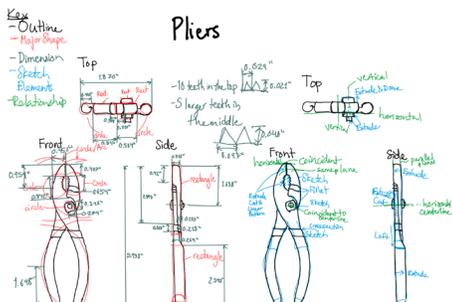
Ruturaj Eksambekar



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Nisha Detchprohim
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Hank Duhaime

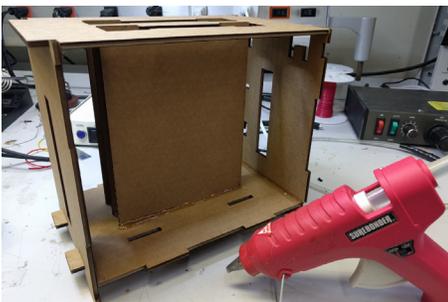


Melissa Baltrusaitis

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Project 4: Interactive Models

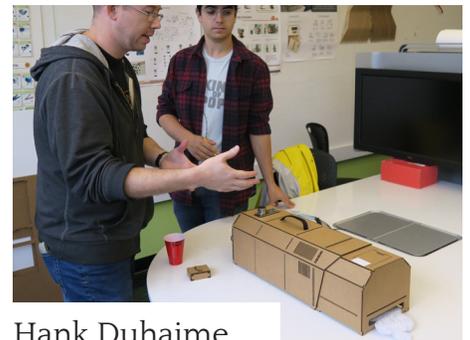
Interactive Models allow for a holistic approach when designing human-computer interfaces by including both physical and digital interactions. These models allow designers to better understand the effectiveness of affordances, signifiers, cues, and instructions. By building representative forms, users can tap into mental models on how to interact and have more clarity about the context of their experience. These robust models allow for repeated testing and iteration so that designers can get more accurate user experiences than those with just a simulated interface on a screen. In order to design and plan the interactive model students create a storyboard and wireframes of the physical and interface interactions, CAD of the model, a laser cut corrugated cardboard model, and a documentation video of the interaction. This model is then tested with peers and external guests. These models are expected to function smoothly. Through testing students learn about the effectiveness of their design and how it could be refined.



Diego Osorio
CS-8803-PP



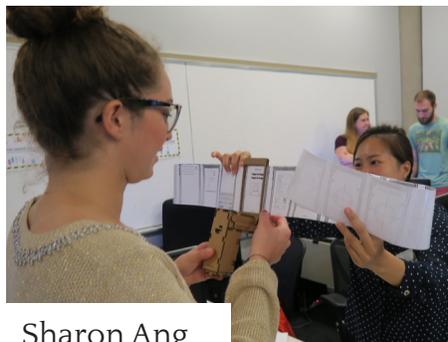
David Howard



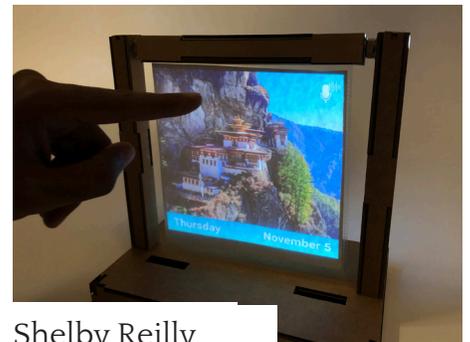
Hank Duhaime



Joe Mccandless



Sharon Ang



Shelby Reilly

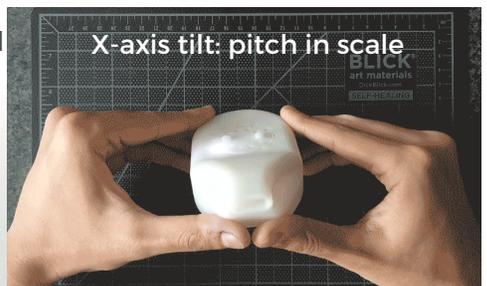
Noah Posner

Project 5: Components & 3D Printing

It is a common occurrence that in the HCI prototyping process electronic components need to be integrated into a prototype. One of the most effective ways of producing this kind of model is to utilize 3D printing to create the housing. 3D printing allows for the creation of high resolution prototypes relatively quickly, needing only one tool, and allowing for easy iteration. In this project students create CAD models of both an existing circuit board and a custom housing. They then 3D print this housing considering details such as split lines, fastening features, and indexing of components. The final device assembly and function is then presented while explaining how decisions were made, changes were evaluated, iteration was utilized, and issues were overcome.



John Koh



Tae Prasongpongchai



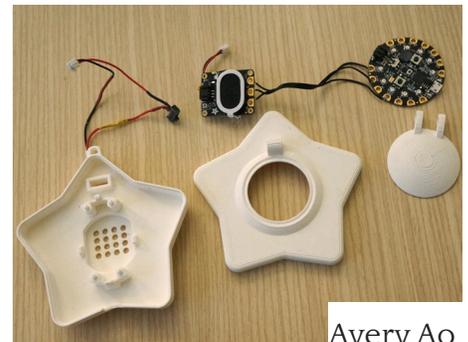
Lulu Saliou



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Hank Duhaime



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