Design Research Projects

Design Research Projects

MFA Candidate, University of Illinois Urbana-Champaign 2015-2018

Beckman Re-imagination
The Beckman Institute for Advanced Science and Technology is home to a range of interdisciplinary research teams making strides in various fields. Currently, the interior shared spaces are dated and do not reflect the amazing innovations occurring within the facilities. This project re-imagines the shared working spaces in this building that will play a crucial role in future collaborations within this iconic UIUC campus building.

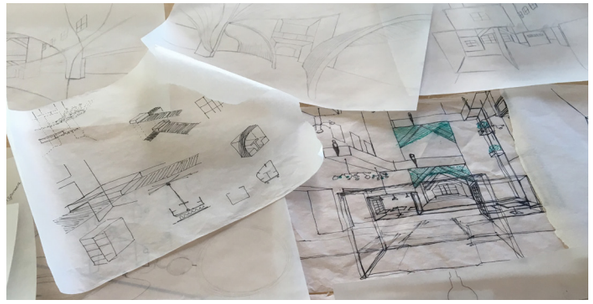
Discussion Table
In new or complex situations, verbal communication often needs tangible visual aids. This is frequently a result of an overload on the working memory. Providing forms or furniture within an environment that have designed affordances for cognitive offloading and distribution of cognition may help ease the verbal communication process.

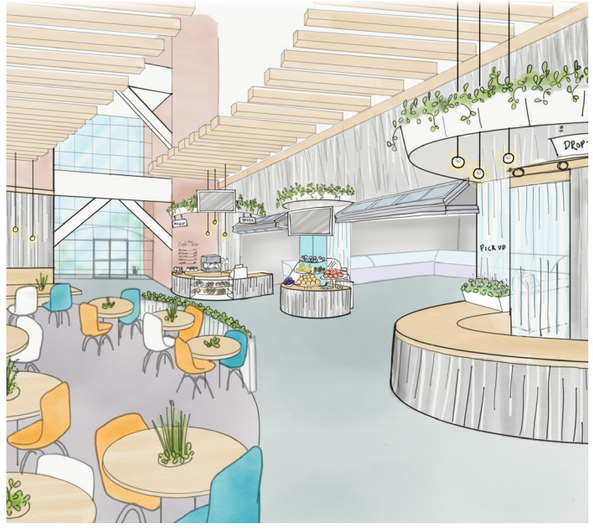
Education Research: GRASP Hand Guide
While working to improve the overall experience of the GRASP study simulations, it became clear that there is a need for some type of physical intervention to make the user's gestural experience more intuitive and approachable.

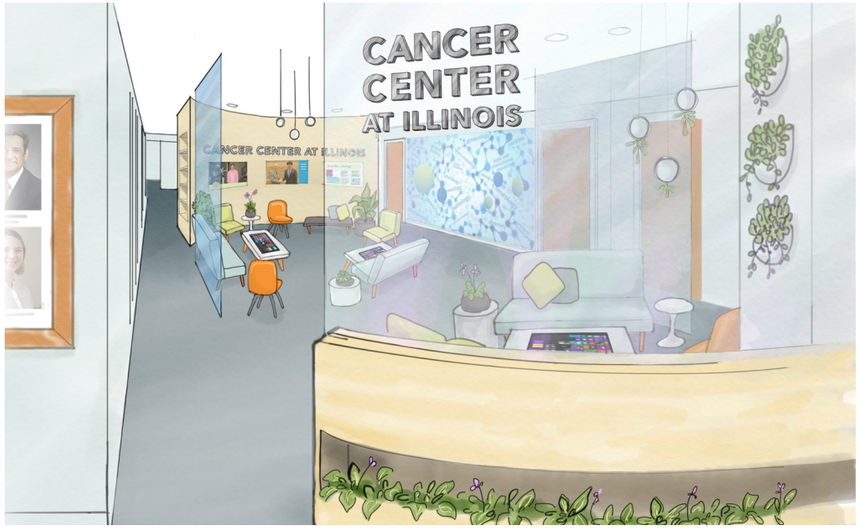
Exploring Affordances: Studio Spring 2016
The topic of affordances was self-selected as the focus for a semester long graduate studio course. The areas explored focused on the perceptions of vulnerable user groups: children vs. parents and people with visual impairments, primarily senior citizens.

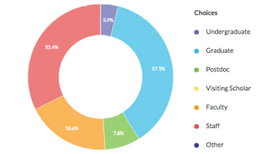
Preemie Pod
For most infants the most beneficial location for healing is participating in skin-to-skin contact with a parent. This method of care is called Kangaroo Care, and there are many infants in the neonatal intensive care unit that are unable to partake in this care based on environmental factors. This product design provides a safe zone for these infants to be held by their parents and gain the health benefits of skin-to-skin contact.

Children's Product Design
These products were designed so that children might instinctually engage, interact, or create their own space within a room. User testing was completed with each prototype.

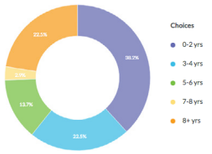




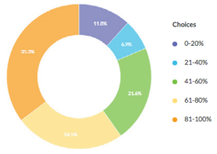




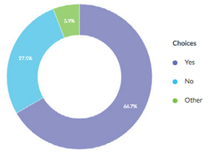
Position at Beckman



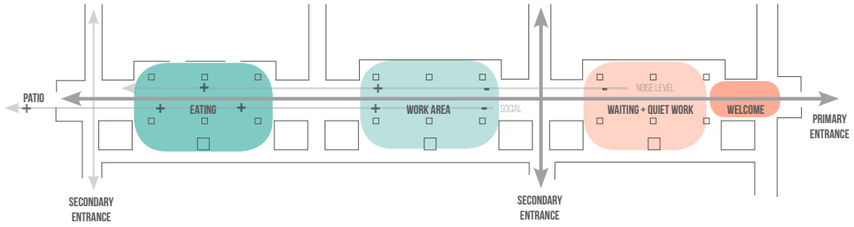
Years at Beckman

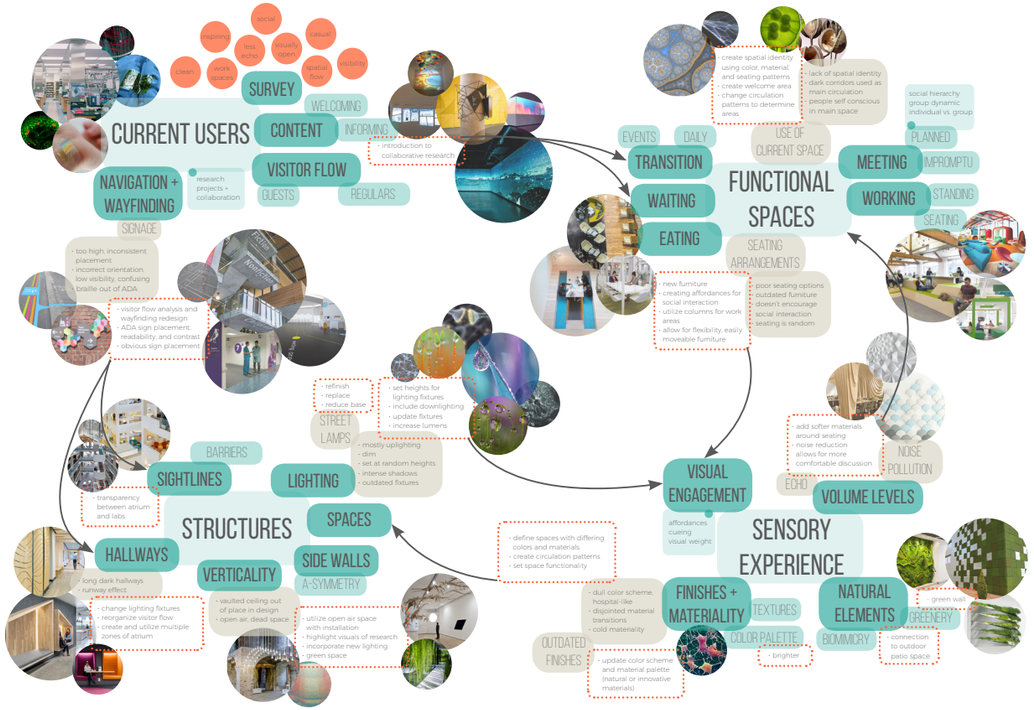


% of work completed in lab



Work can be completed in public





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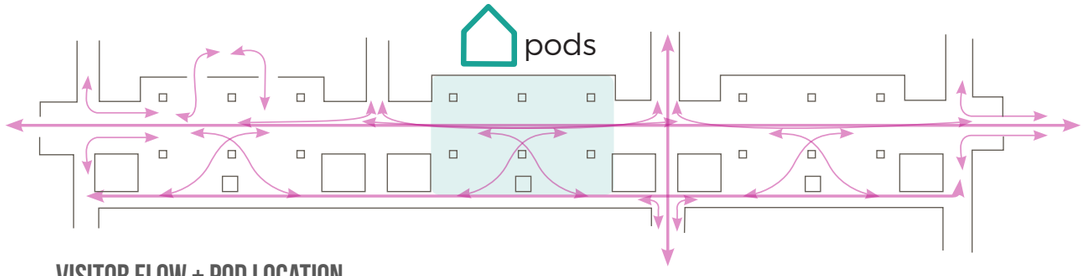
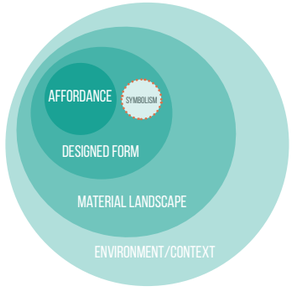
Beckman Re-imagination

The re-imagination of the Beckman Institute for Advanced Science and Technology on the University of Illinois Urbana-Champaign campus began a transdisciplinary exploration of concepts to refresh their vast atrium space. Based on that group work, two designers were hired to complete the redesign of various areas throughout the building including, but not limited to, the atrium, cafe, hallway work spaces, administration suite and research "neighborhoods" throughout the large interdisciplinary research facility. In order to stay true to the mission of Beckman Institute and create functional environments for work and collaboration, various methods of observation and data collection have been completed and are still currently underway. Initial observations and survey data collected from residents of the Beckman community, allowed for the creation of a "mind map" to help identify and connect current state and goal states for the atrium space, while also bringing to light common "problem" themes throughout the many areas of the building. As this project is currently underway, outcomes have yet to be determined, but there is exciting potential for using designed form to create intentional spaces that shape opportunities within a building that is world renowned for advancement through collaboration.

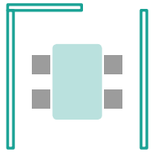


VISITOR FLOW + POD LOCATION

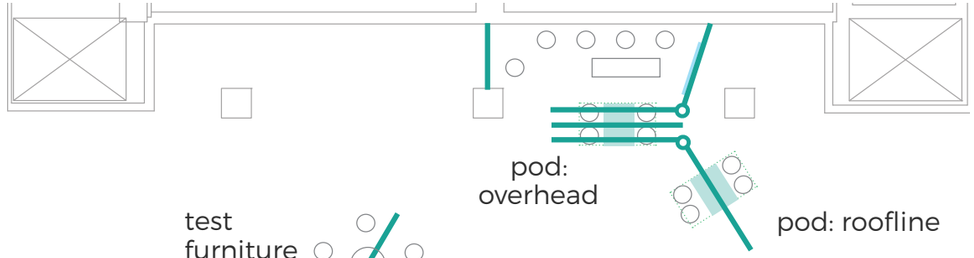


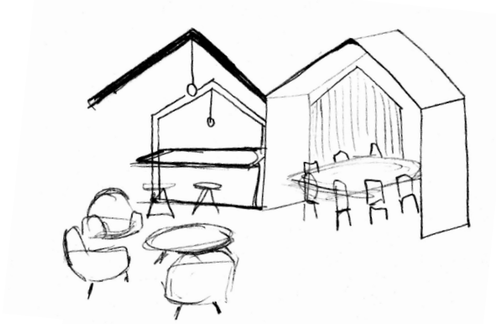
POD: OVERHEAD
(front view)

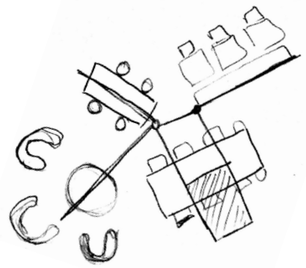
POD: ROOFLINE
(front view)



POD: ROOM
(top view)







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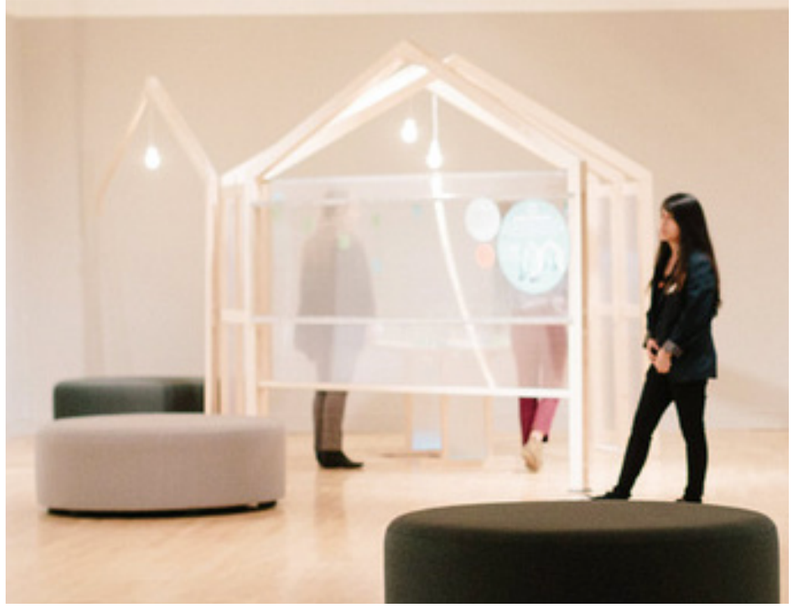
Beckman Re-imagination || Thesis Project

One portion of the Beckman re-imagination has been dedicated to thesis related research, focusing on the question: 'How can designed forms create a material landscape within the atrium of a higher education facility that represents, supports, and encourages interaction and collaboration?' This exploration has progressed through initial research stages and observed testing of low fidelity models within the Beckman atrium (IRB approved). As part of the low fidelity testing two pod structures were created and placed in the space to disrupt visitor flow and interaction with the space. The structures house three interactive tables, allowing for comparison of user interaction at each structure type. The low fidelity interactive tables were created based on a previous design project that explores the impact of environmental affordances that may support discussion.



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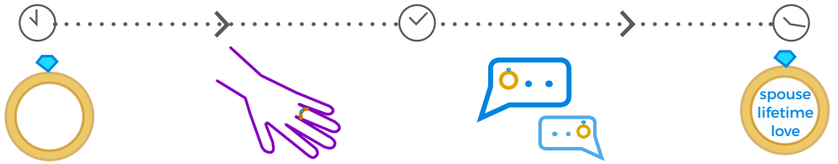
Beckman Re-imagination || Thesis Project

A final prototype of a flexible pod workstation was created for the Beckman Institute atrium. This prototype can be set up with to meet various needs, creating diverse interactive opportunities. The prototype is shown here on display in the Krannert Art Museum on the University of Illinois campus, prior to its installation at Beckman. The final prototype was created out of 3/4" plywood, corrugated plastic, acrylic, and lighting configurations. The updated design for the interactive table has drop leaf sides and features brainflakes building toys, various hands on elements, and adjustable base lighting.

Objects as Symbols



object

sensory
tactile, scent, visual

verbal
"...marry me?"

container
Symbol of information

LASTING: CULTURALLY ESTABLISHED + TEMPORARY: SOCIAL DISCUSSION

Cultural or communally decided meaning (Streeck, 1996)

Assisting memory

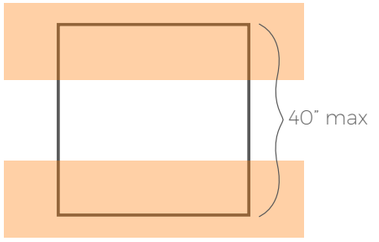
Memory can be assisted by visual and physical representations of thoughts, this reduces stress on working memory.

Cognitive offloading

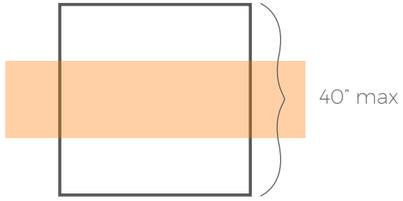
Using physical elements of the environment as mental representations of information.

Distributed Cognition

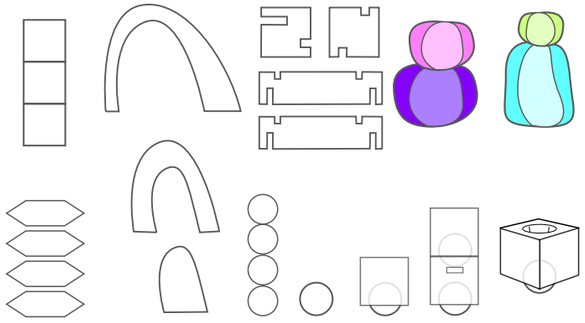
Relying on another member of a group to hold important information.

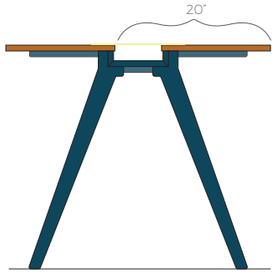


Personal Space

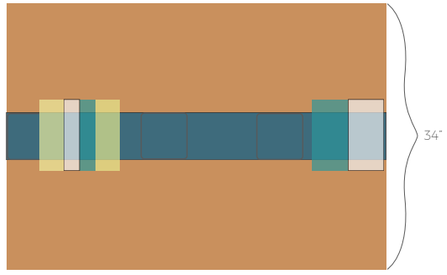


Communal Space

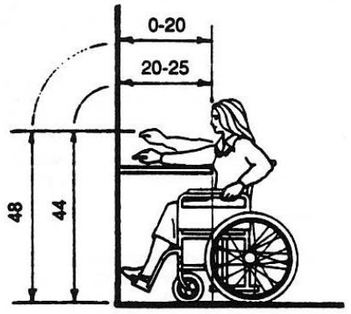




Side View



Top View



(ADA Seated Reach)

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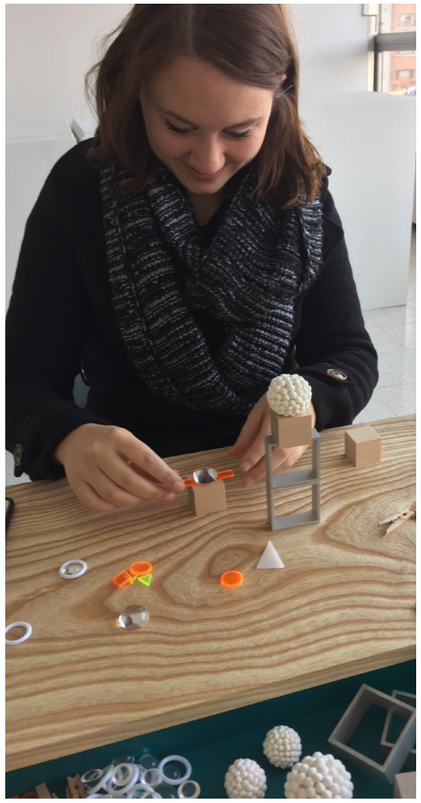
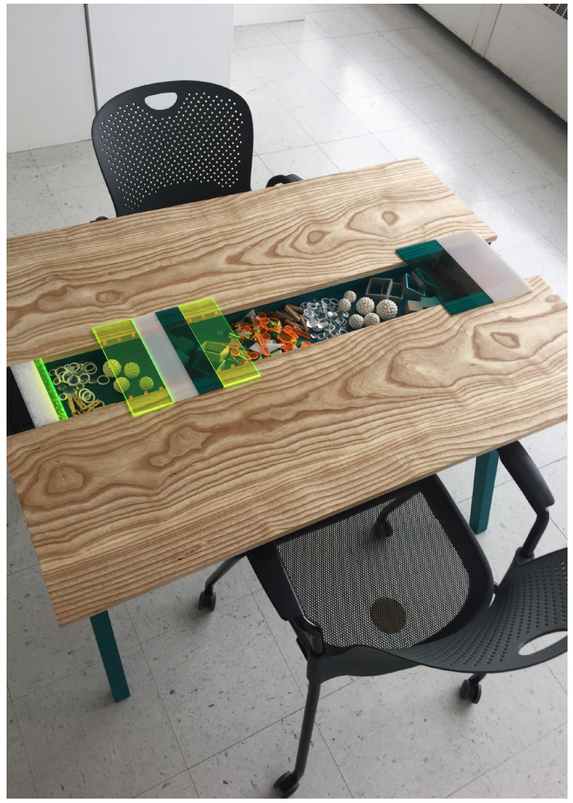
Discussion Table

This project is focused on creating a form that may help to break down communication barriers through the use of low-tech, designed affordances that allow for cognitive offloading. This concept has taken on the structure of a familiar gathering location, a table, in order to facilitate a natural starting place for communication. The incorporated affordances will allow visitors to the table to reduce cognitive load and distribute their cognition in order to encourage a flow state in general discussion, educational explanation, and creative idea generation, while aiding in expression through moveable tangible elements. This project is still in the early stages of development, but the potential for user testing and design refinement of multiple design variations may lead to some exciting beneficial outcomes for users.





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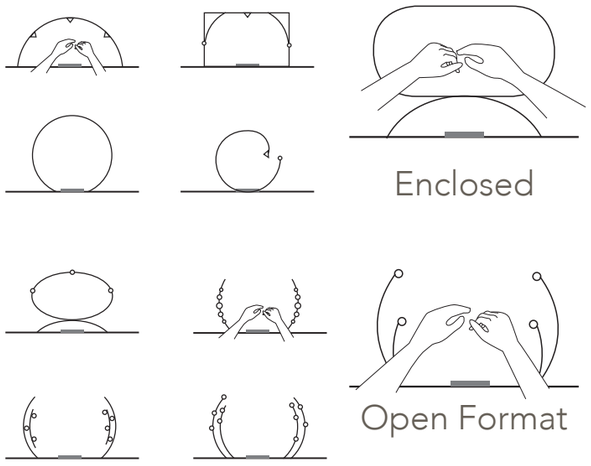
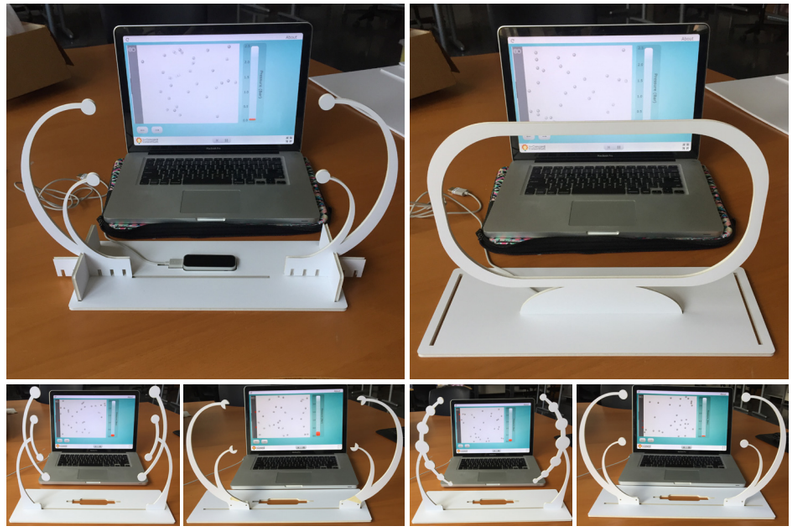
Discussion Table

The final model was crafted out of painted birch plywood and book-matched ash planks. The objects incorporated into the final design used colors associated with inspiration and creativity and abstract forms that held no prior symbolism. The table created for this project was featured in the Link Gallery of the UIUC School of Art + Design. During that time informal observation was conducted and the interaction after-math was documented each day, before "resetting" the table and returning all of the thought objects to their starting point. Based on the initial success of this model the concept has been carried through into the Beckman Re-imagination project to further explore how affordances for cognitive offloading influence discussion and interaction in the atrium spaces of higher education facilities.

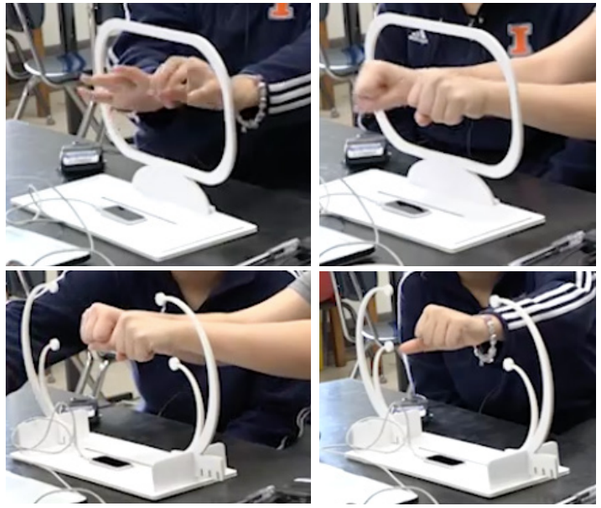
Concept Sketching



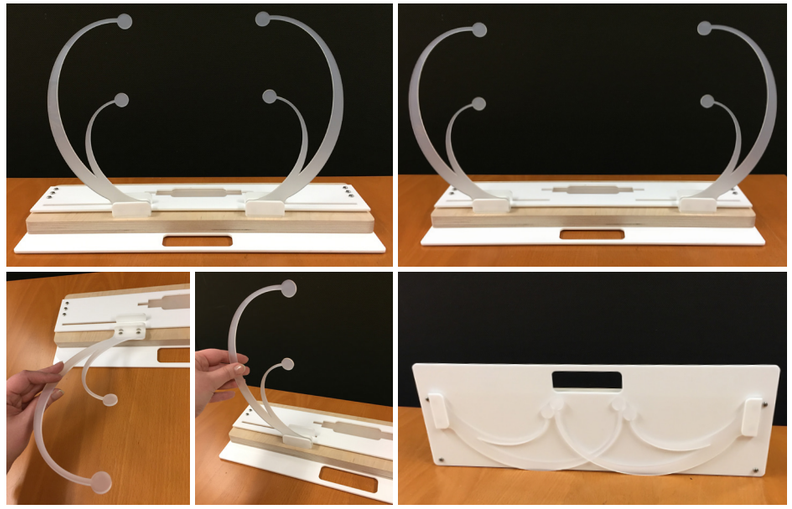
Low Fidelity Prototyping

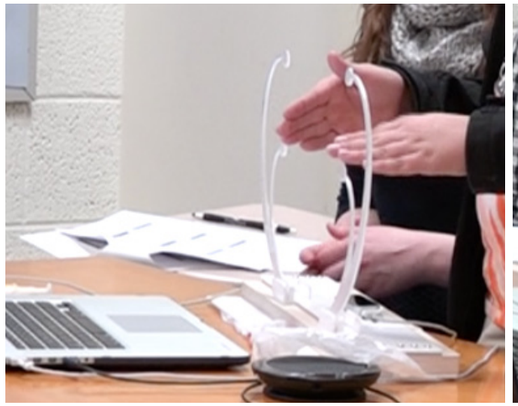


Early User Testing



Designed Form





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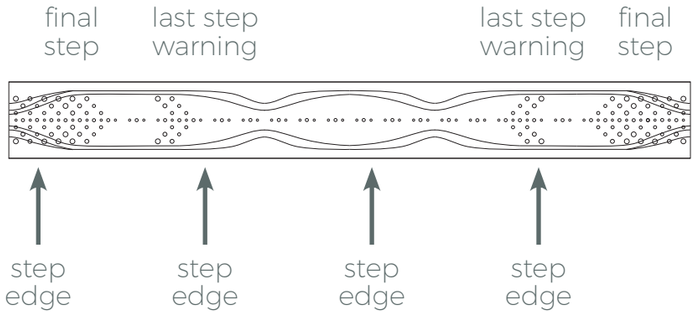
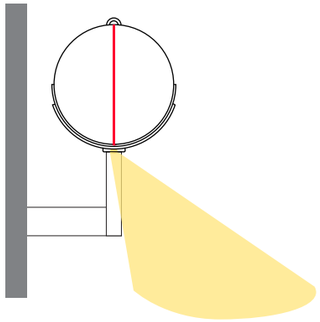
GRASP Hand Guide

While working on the NSF funded GRASP (GestuRe Augmented Simulations for supporting exPlanations) project, it became clear that study participants were having difficulties engaging with the device that captures students' hand gestures to manipulate the simulations. In order to reduce usability challenges and enhance the connection between the student's gestures and the scientific concepts presented on the simulation screen, a hand guide was created. The device gives students a reference within their visual field of where they should complete their gestures throughout their interaction with the science simulations. In early use, researchers reported having the hand guide device has been advantageous. Further testing needs to be completed to document the impacts of its use and continue shaping the design.

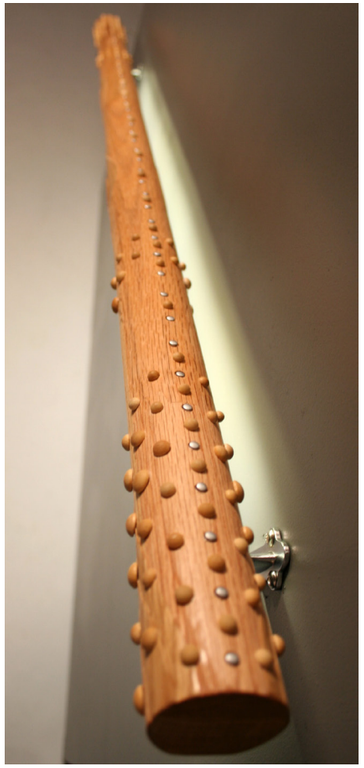
Tactile Pattern

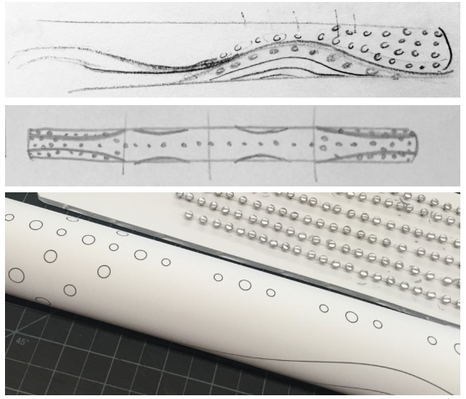




Lighting

- banister lights stairs when user is in contact with tactile elements
- lights are battery operated to maintain function during power outages





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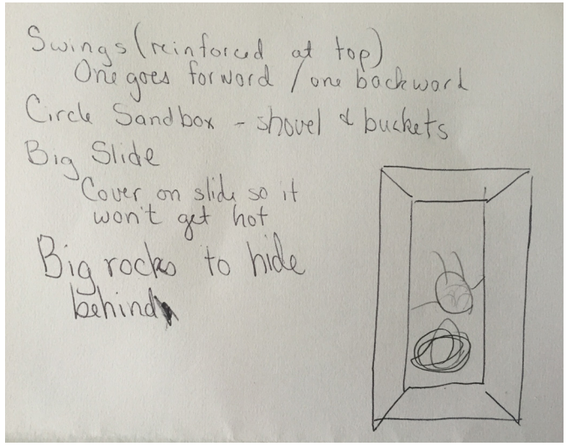
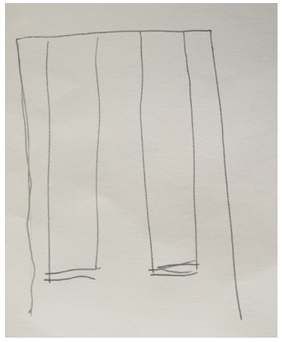
Exploring Affordances || Studio Spring 2016

Enviable Assistive Devices

The goal of the first exploration of this semester was to design a product with affordances to assist with navigating in low visibility circumstances. The created handrail for navigating staircases provides a tactile guide that informs the user of each step in a staircase, when they should increase their proactive grip and when the staircase is coming to an end. It also features additional lighting that is activated when the users hand is in contact with the railing, encouraging continuous contact. This project lead to a concept for creating enviable assistive devices for every home. As with all objects and environments that are well designed, assistive products should be enviable and desired within the general consumer market, eliminating the stigma surrounding the need for assistive products. Allowing consumers to start the process of preparing their home for later stages of life is possible with the creation of designs that allow for cognitive off-loading and create good habits. Establishing memorable interactions with touch-points in a familiar environment may increase functionality and safety, while providing an opportunity for increased independence over time.


*photo cred: KOOP Champaign





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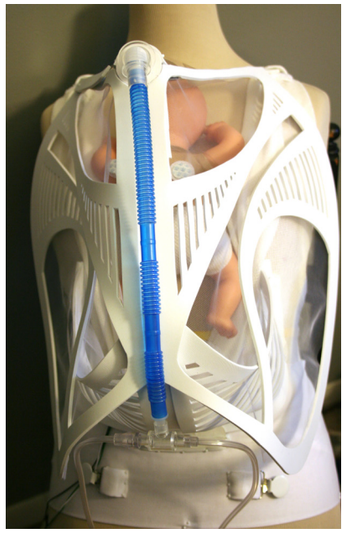
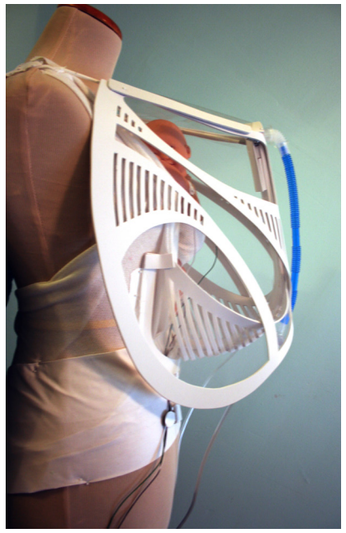
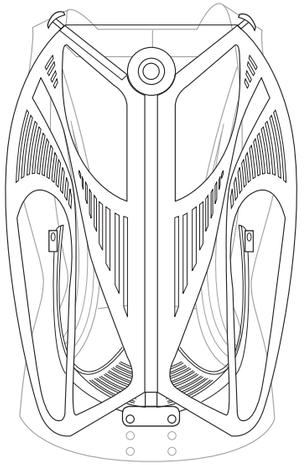
Exploring Affordances || Studio Spring 2016

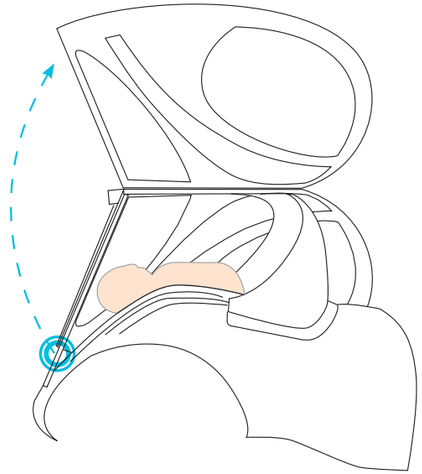
Playground Perceptions

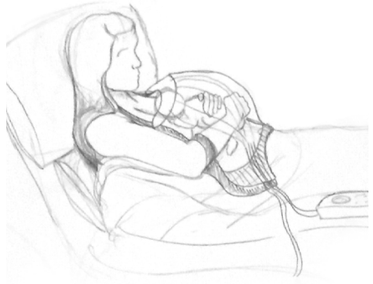
The second half of this semester was spent exploring potential research strategies for gathering data on the differences in perceived affordances between children and parents, in order to identify play opportunities and perceived safety issues. Playgrounds were selected for the study because the majority of interactions in these spaces rely purely on environmental form, and children are likely to experiment with found affordances in unfamiliar spaces. Multiple methods were explored for data collection included having children build, draw, and describe the play environments to provide insight into their expectations. Additional tests for data collection involving having children wearing GoPro body cameras and eye level cameras were also conducted, with additional exploration into the use of accelerometers and activity mapping over play time. Within the short time line of the project, the viability of multiple research methods were considered and tested. These initial studies lead to identification of future research opportunities.

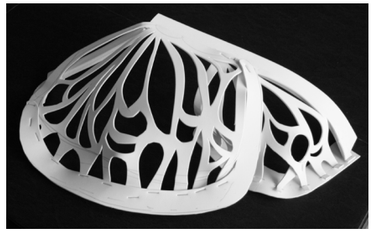


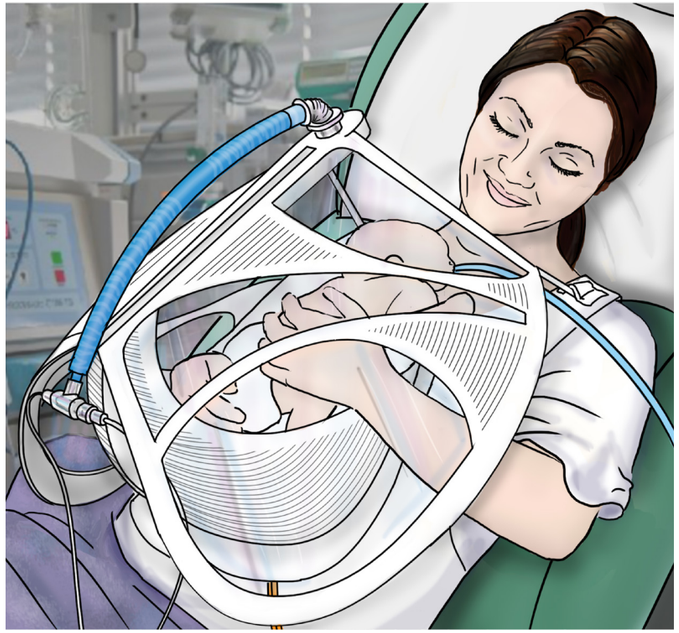


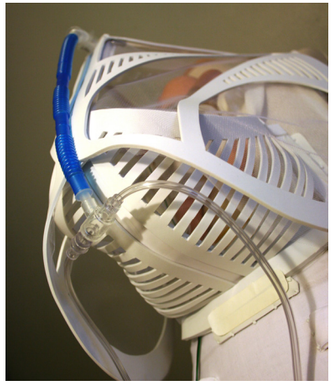


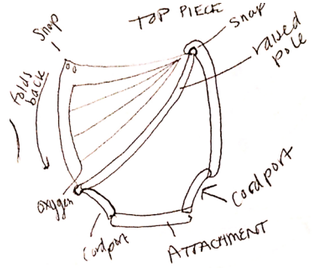


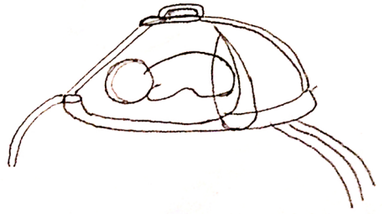


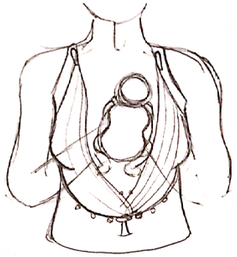












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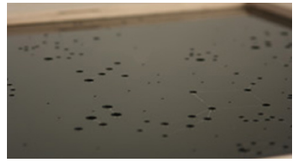
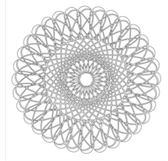
Kangaroo Care Preemie Pod

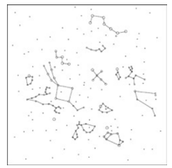
This product is a wearable incubator pod that creates a safe, warm, and oxygenated environment for preterm infants. The portable 'preemie pod' allows infants who are traditionally restricted to their incubators to participate in Kangaroo Care (skin-to-skin contact) with their parents. This device creates the smallest amount of mobility during their stay in the Neonatal Intensive Care Unit (NICU), but allows for the infant to participate in Kangaroo Care which is proven to give life long health benefits and shorten the time spent in the NICU. Key Features: provides controlled environment during Kangaroo Care, provides body temperature regulation for the infant without view obscuring blankets, allows infants restricted to oxygen hoods to participate in Kangaroo Care and creates a private atmosphere for the parent to engage in Kangaroo Care, without disrupting the overall NICU space.










Light Forts

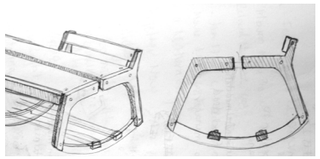
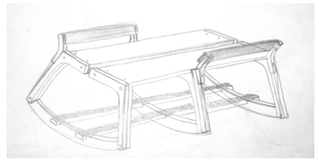
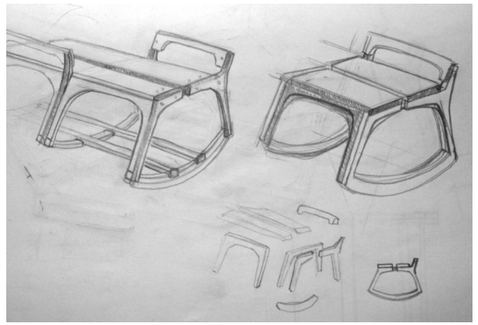
Fall 2009: Pieces Senior Project

These forts are the result of a semester-long, self-defined studio project inspired by blanket forts and toys from childhood. Each fort can be altered to create a high canopy or a low blanket fort just by adjusting the number of leg pieces during assembly. This versatility allows for anyone to enjoy the spaces created within. These ephemeral forts pack up with ease into their self-containing bases, creating a simple yet beautiful box.







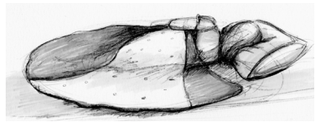
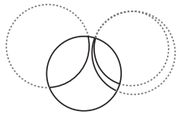




1...2...3 Rockers

Spring 2010: Furniture II

These playful rockers were created to encourage interaction and cooperation between children. The benches of varying lengths allow the children to face each other in a manner reminiscent of a tête-à-tête chair while rocking. The chairs were designed for simple mass production; allowing for easy custom color and number of seats per rocker.



LED constellation lights up when the upper edge of the blanket is hugged.

Night Light Blanket

Spring 2008: Meaning of Form ID II

This blanket was designed in response to a project entitled "The Meaning of Light." The blanket is meant to encircle a child, providing a feeling of comfort and security. The constellation of LEDs within the fabric can be lit by the child hugging the upper corner of the blanket or by setting the timer switch.

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