

# Sid Miller

futuristic technology, traditional furniture, and everything in between

# Projects

## Reuleaux

*Next generation 3D modeling tools for working in mixed reality*

## Room Essentials Lighting

*A collection of decorative lighting designed for Target*

## Rotary Grater

*An ergonomic cheese grater for the home kitchen*

## Robern Cartesian Vanity

*A premium bathroom vanity to overcome limited mobility*

## Interactive Photography Display

*Designed and fabricated for The Sigal Museum*

## Projects with Oat Foundry

*Custom signage, table settings, and decor*



# Reuleaux

Next generation 3D modeling tools for working in mixed reality

- Designed for creative professionals
- A next-generation system of tools for quickly and intuitively designing in 3D
- Focused on the ergonomics, user experience, and utility of working in mixed reality



For a better demonstration of the user interface and features: watch the [Reuleaux demo video](#).

For more in depth details about my design process and insights, check out my complete [senior thesis book](#).

# Immersive Computing

Augmented reality and virtual reality aren't two distinct categories, they are parts of the spectrum of immersive computing. **My goal is to design physical and virtual controls which are practical for systems along the entire spectrum.**





# Current Design Tools

I explored the tools that designers are currently using. I asked designers why they choose one tool over another for certain tasks, what the most helpful features are, and what the most frustrating aspects of each tool are.



Hand Sketching



Model Making



Photoshop & Illustrator



Digital Sketching



3D Modeling



# Current Mixed Reality Controls

## Oculus Touch Controllers

Thumb sticks and buttons modeled after video game controllers



LED tracking array wraps around hand to prevent user from blocking it



## Microsoft Mixed Reality Controllers

LED tracking array is held out in front of user's hands



Uses thumb sticks in addition to small touchpads

Uncomfortable square grip

## HTC Vive Controllers

Sensor array is held out in front of the user's hands



Large touchpad provides main point of interaction

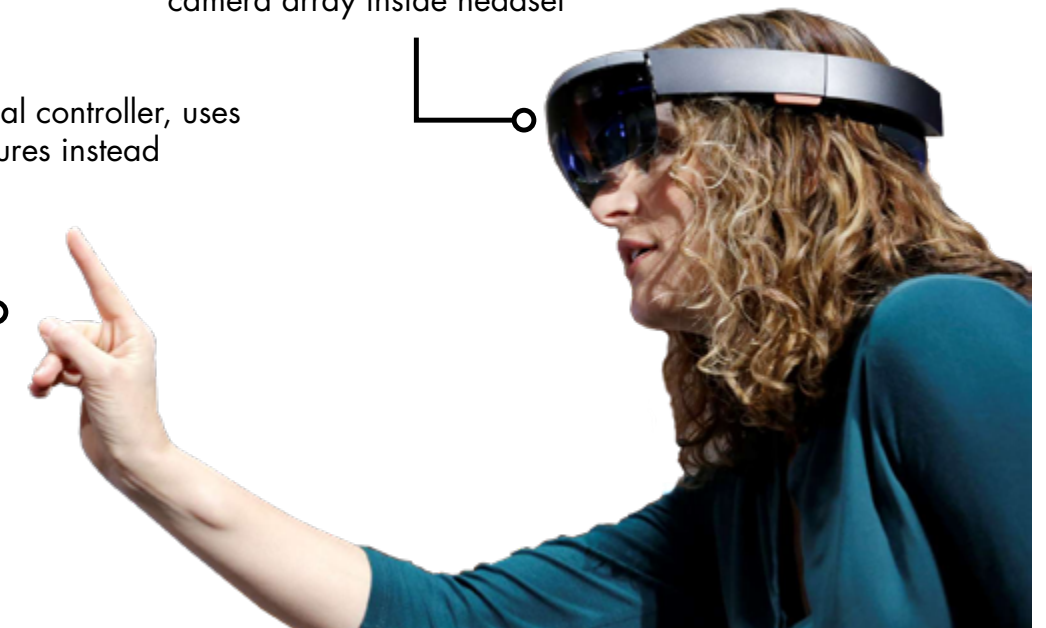


Held more like remote controls than game controllers

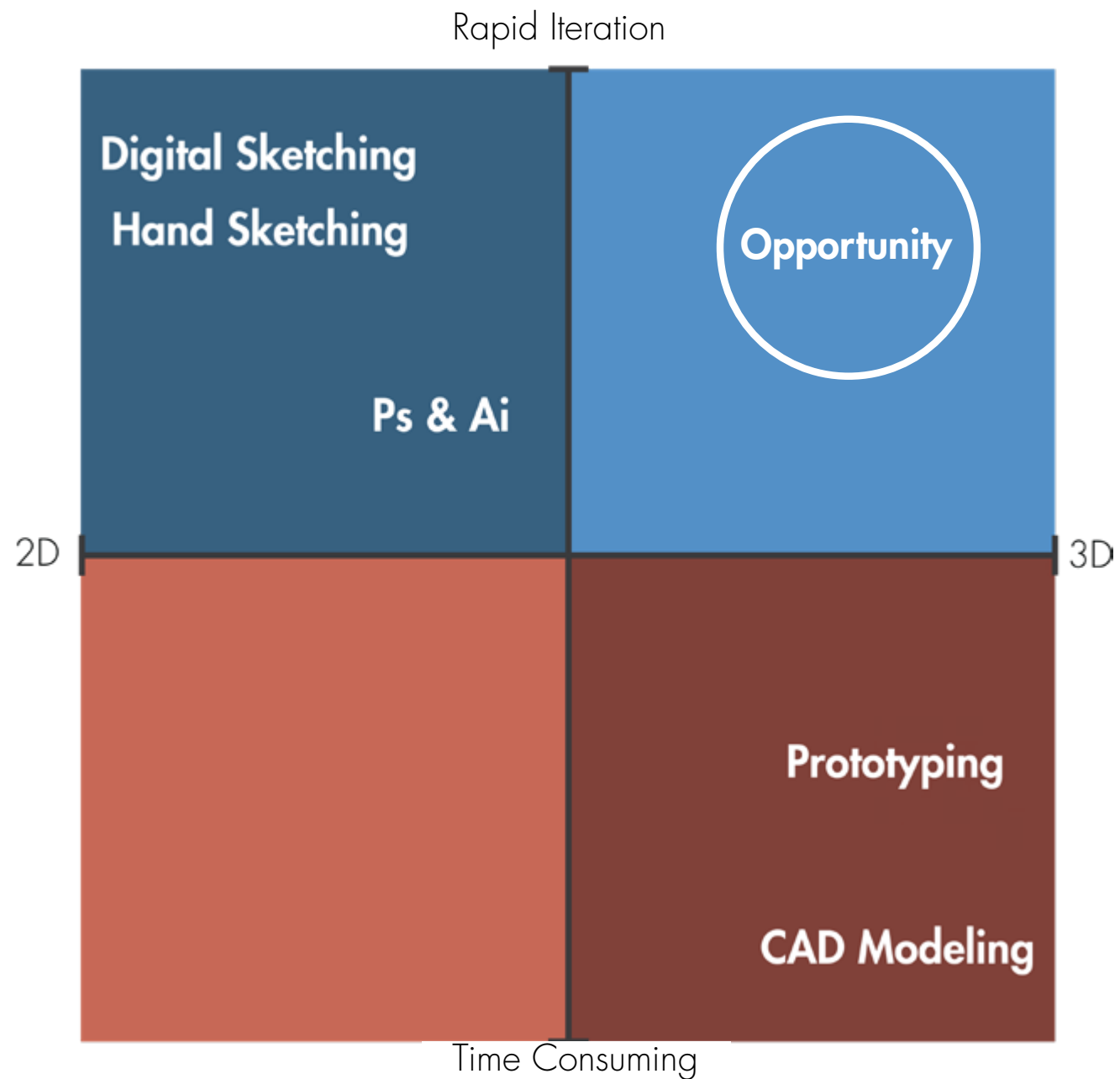
## HoloLens Gesture Controls

Hand gestures tracked by camera array inside headset

No physical controller, uses hand gestures instead



# Opportunity



Studying these tools showed that there is a gap in the design tool kit. There is a need for a tool that allows for fluid design and rapid iteration, but functions in the 3D space. This would allow designers to work three dimensionally earlier in the design process, without sacrificing speed and flexibility.





# Conditions for Success

## What features do designers need?

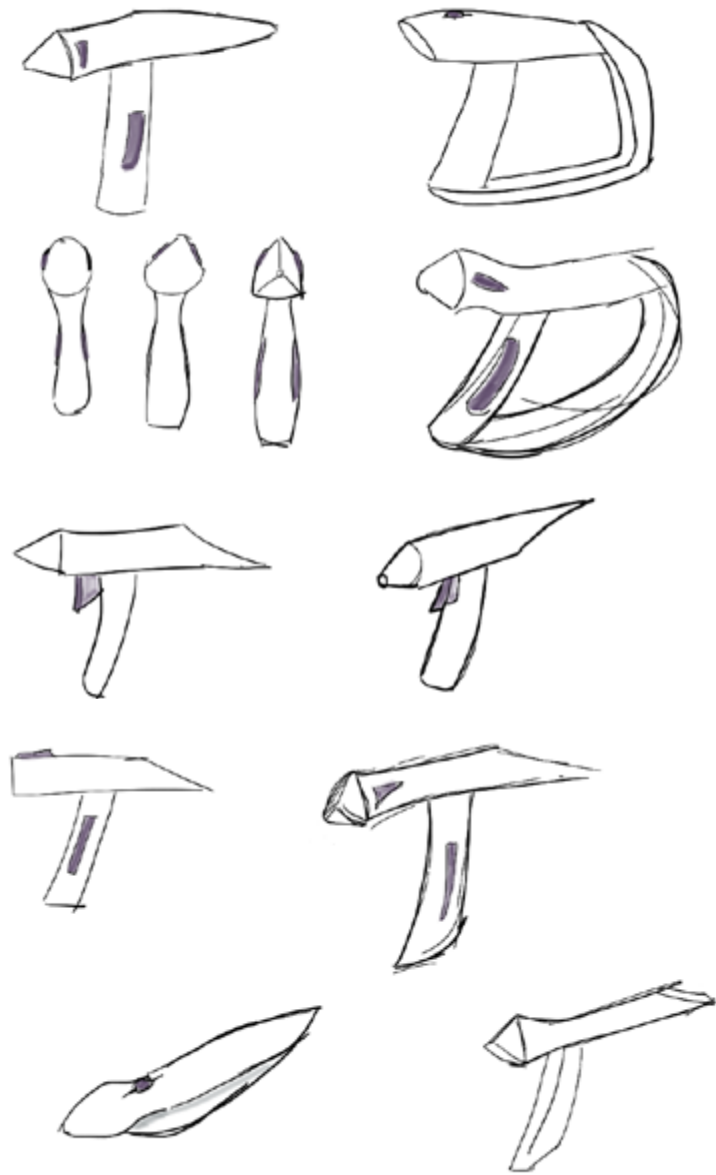
- Rapid creation of 3D sketches and models
- Accurate scale and proportion in 3D
- Demonstration of interaction and functionality
- Rapid iteration and collaboration by seamlessly duplicating and sharing models
- Independent, simultaneous control of model orientation and virtual tools
- Ability to easily fix or undo mistakes
- Practical for individual, collaborative, and demonstrative scenarios



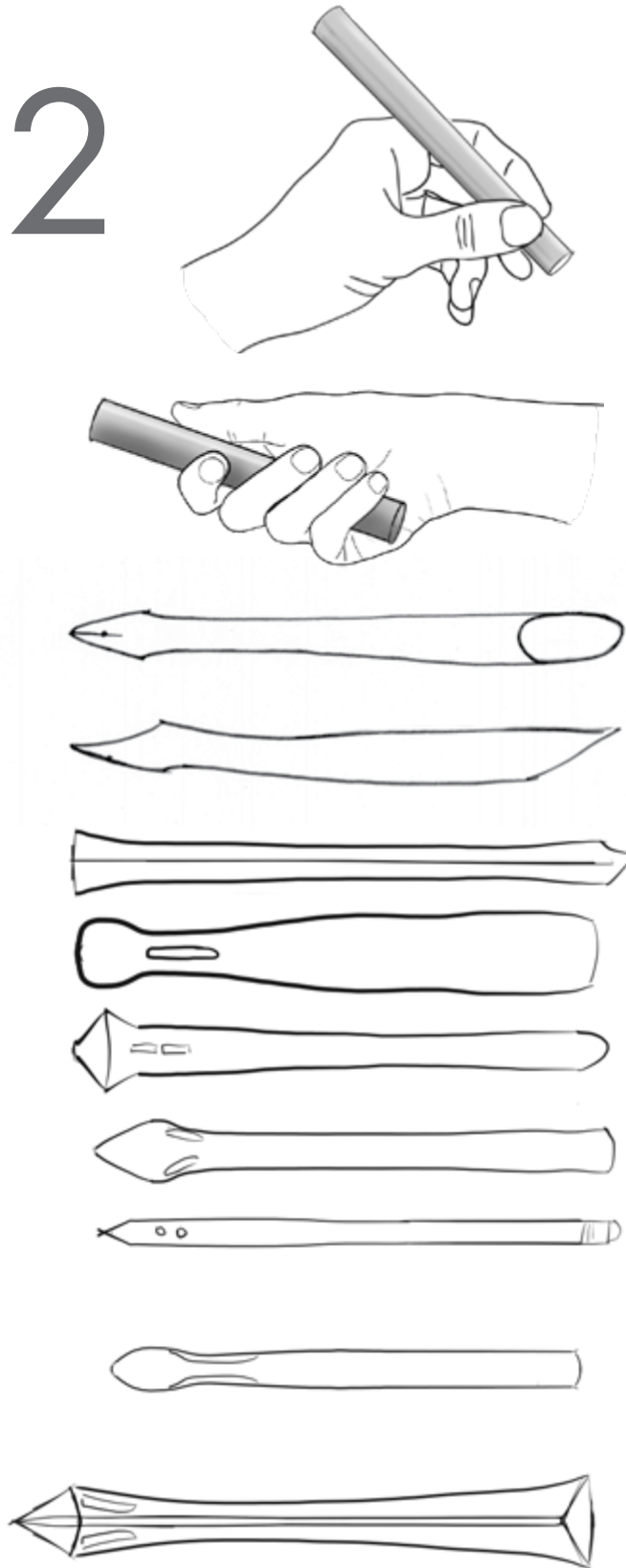


# Controller sketch development

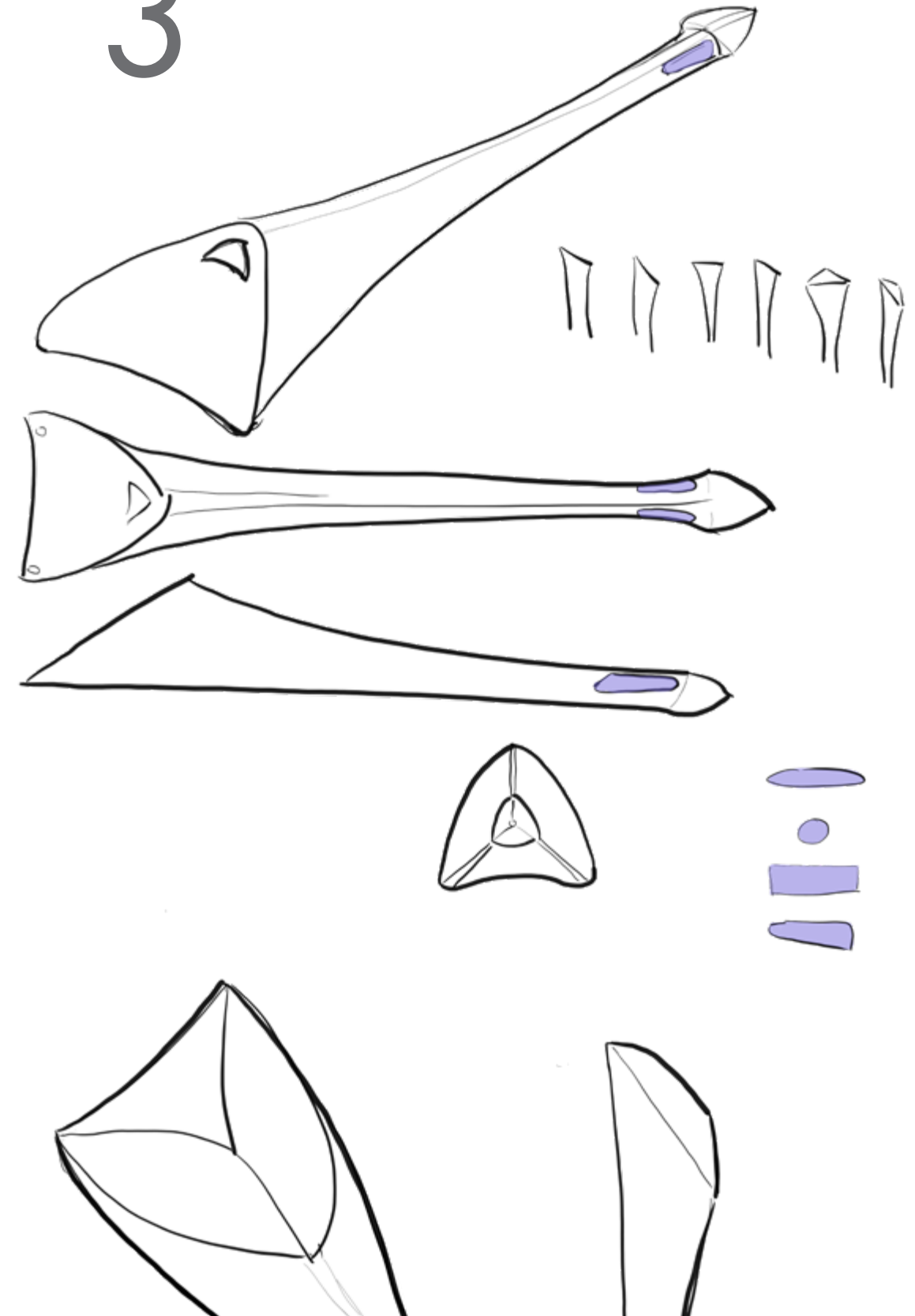
1



2



3

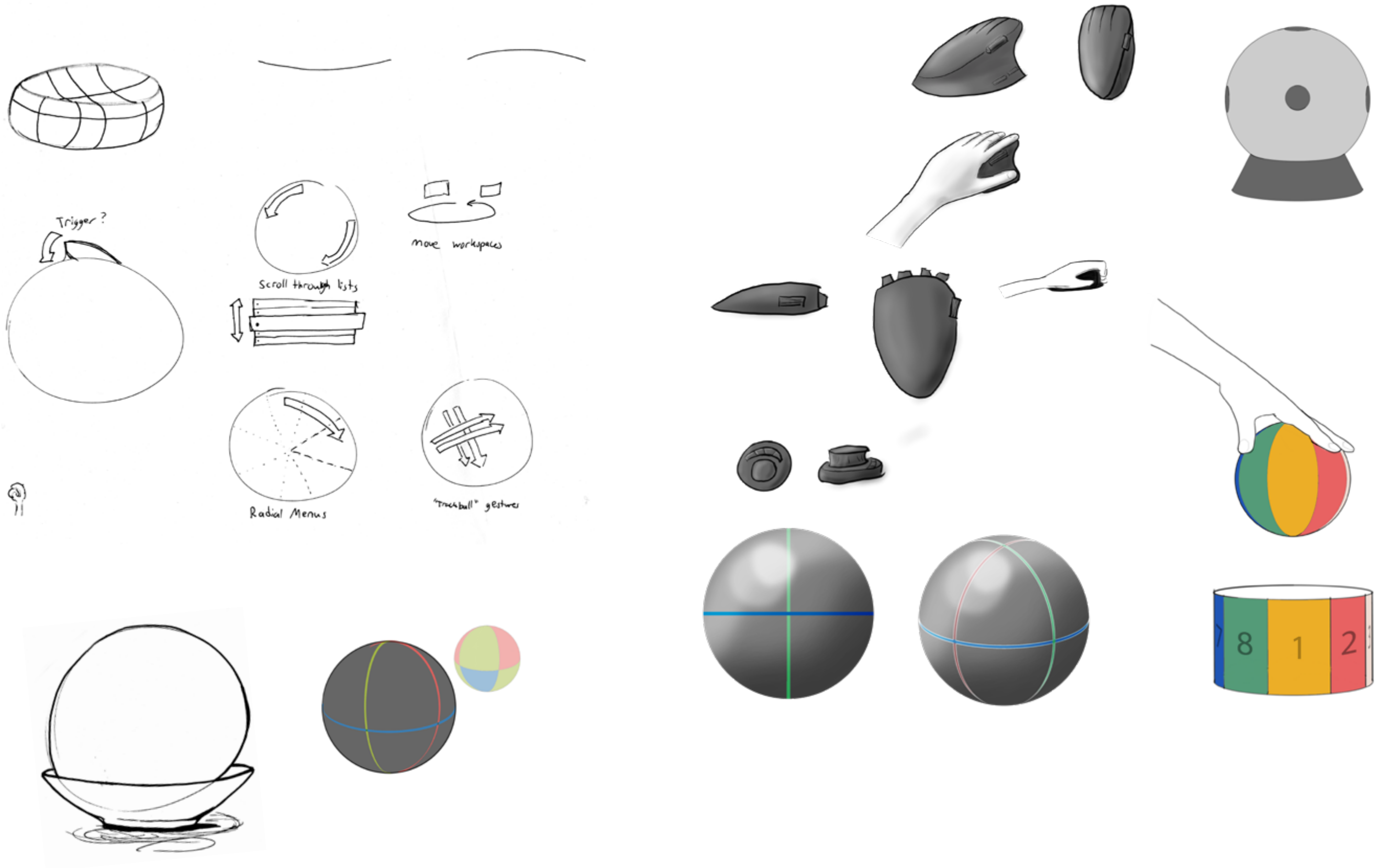


# Prototyping and testing

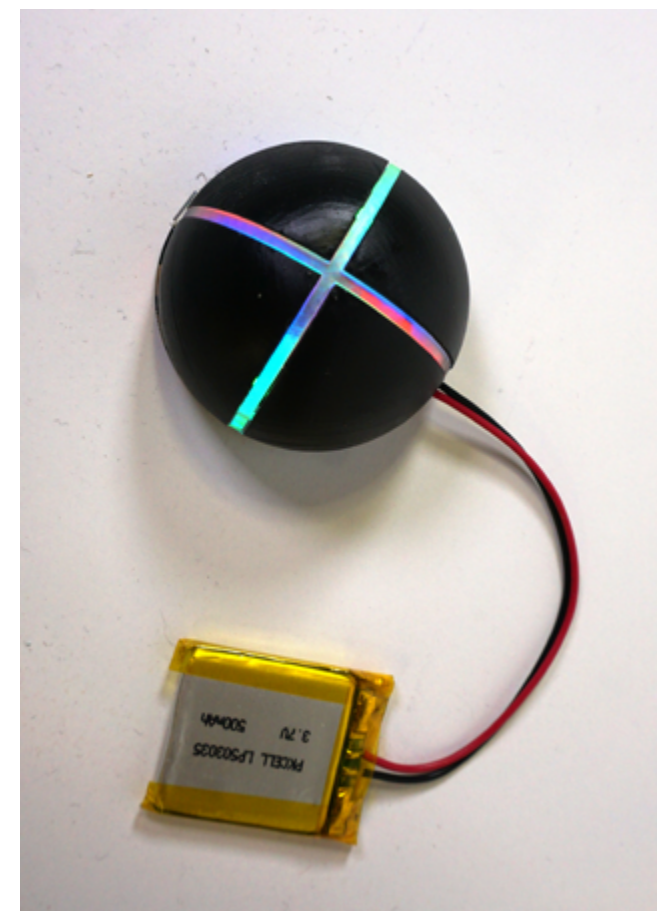
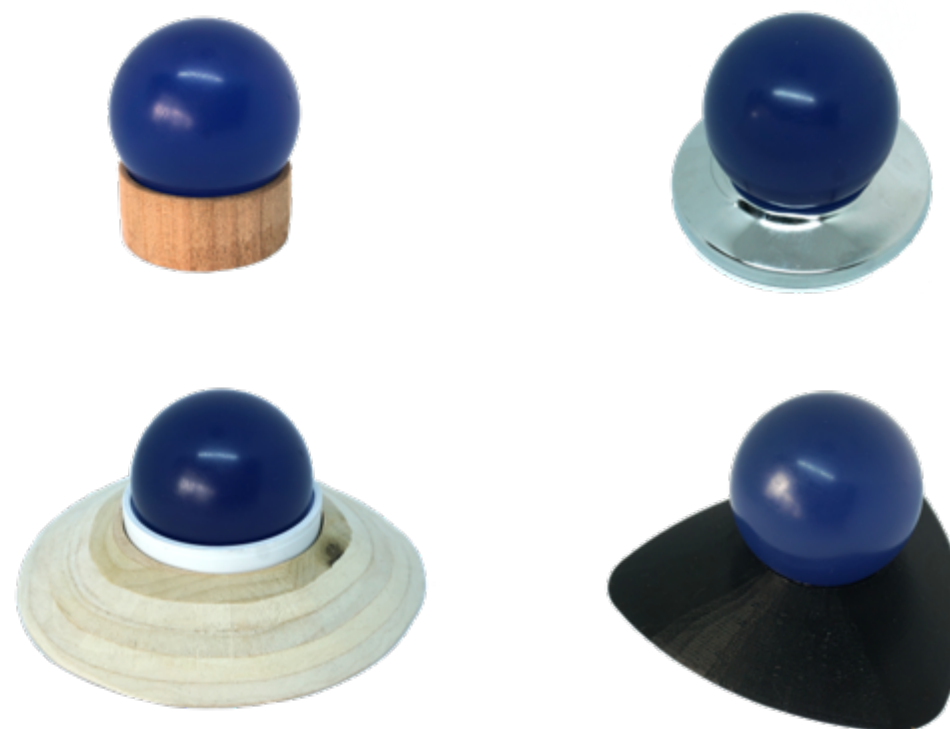




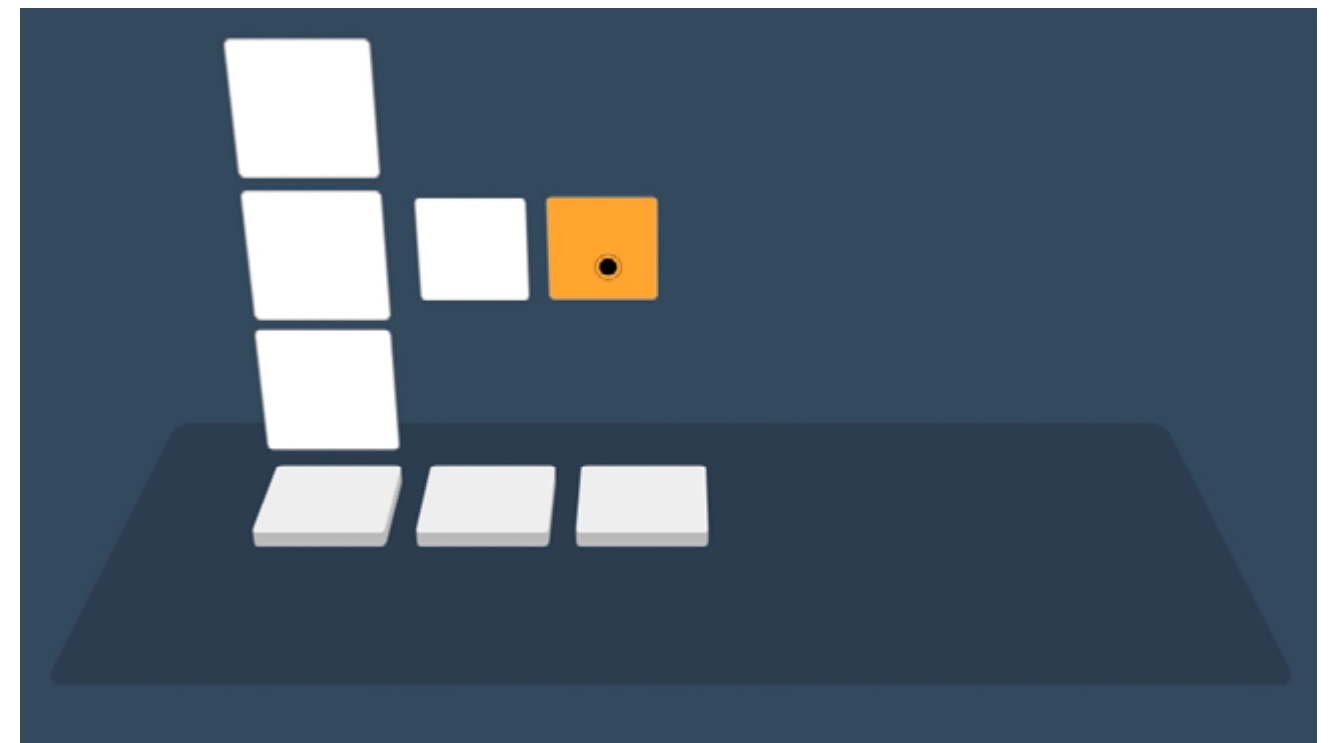
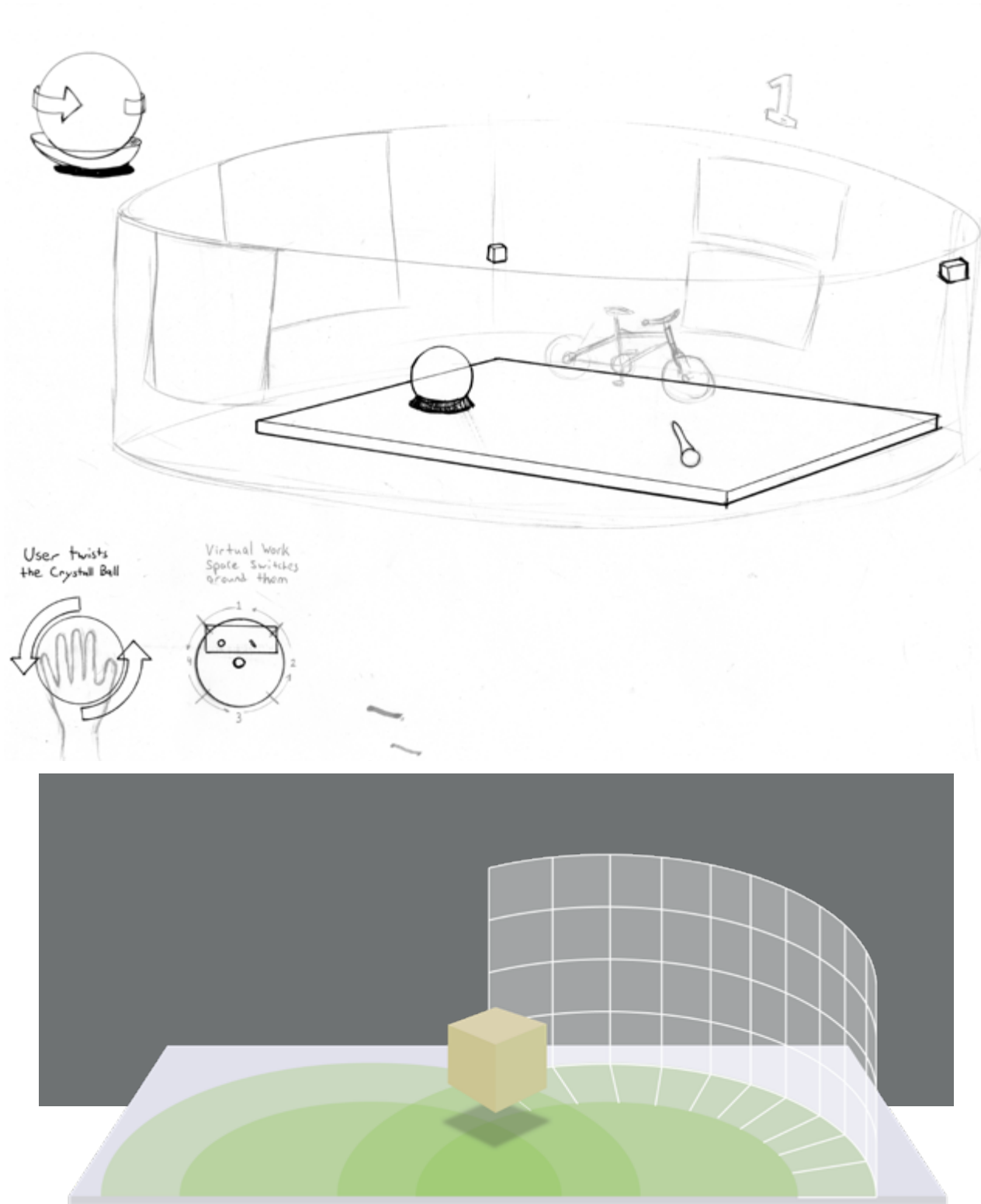
# Off-Hand Controller sketch development



# Prototyping and testing



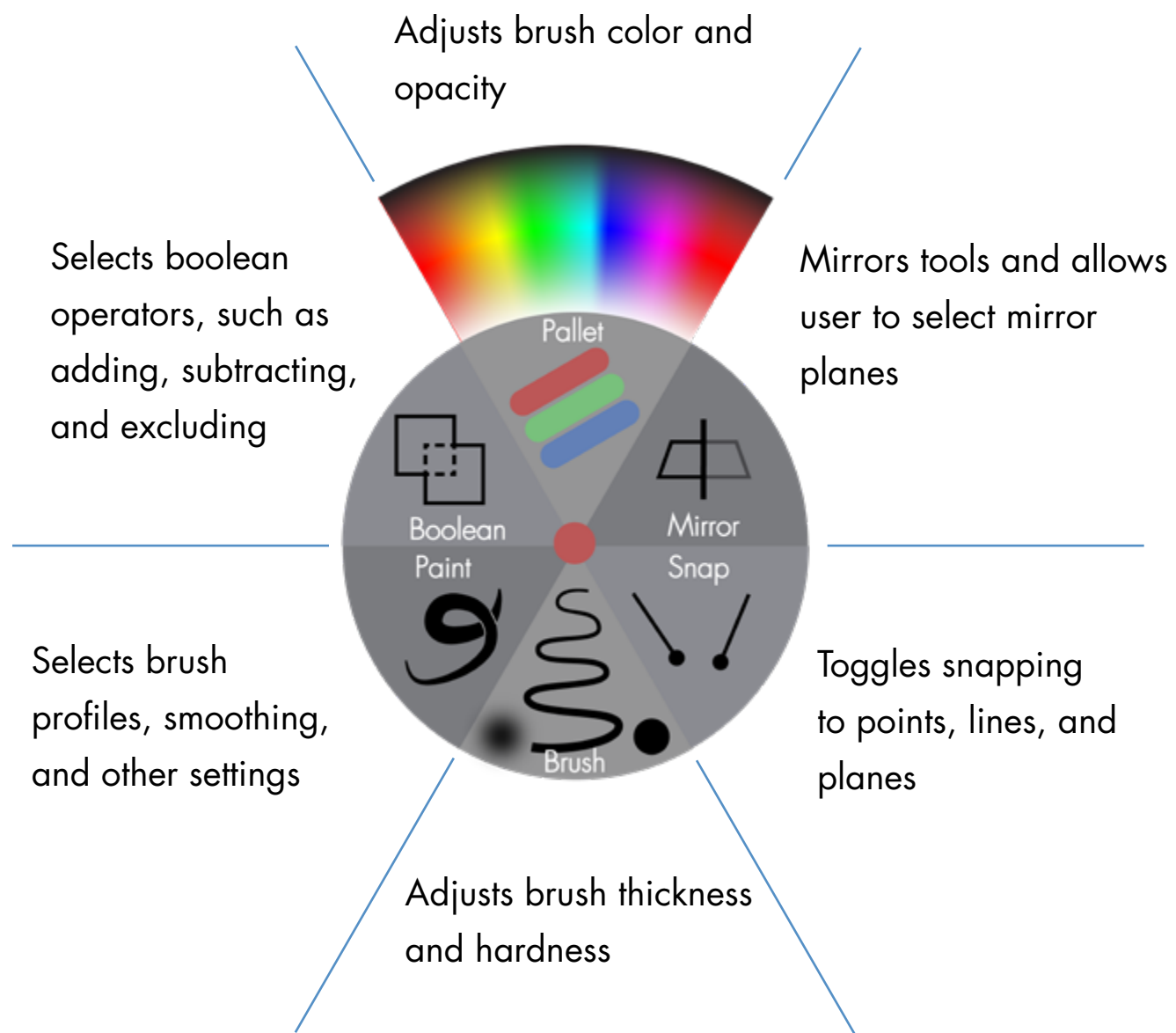
# UI Sketches and Mock-ups



In this system, the design of the physical tools is directly linked to the user interface and the virtual interactions. I explored different ways of building models, displaying information, and accessing settings. I sketched and then mocked up some examples using Adobe After Effects and A-Frame, a webVR framework to test my concepts with users.

# Final Reuleaux UI

Radial menus allow for quick access to relevant settings. They are opened by the menu button on the pen, and appear directly in front of the user. As the user moves their pen out from the center, each menu item expands to show more controls relevant to that setting.

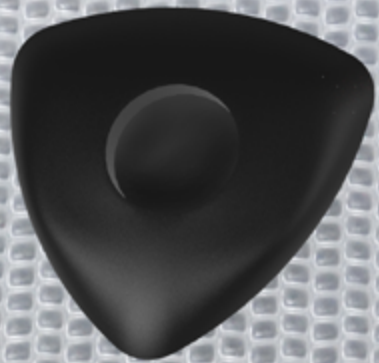


Desktop menus allow for switching modes and accessing less commonly used settings

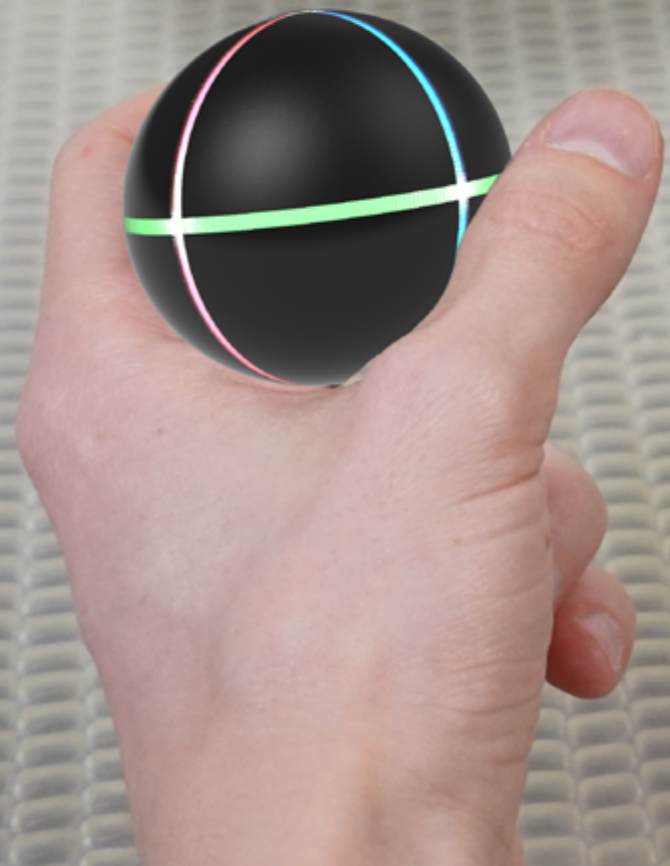
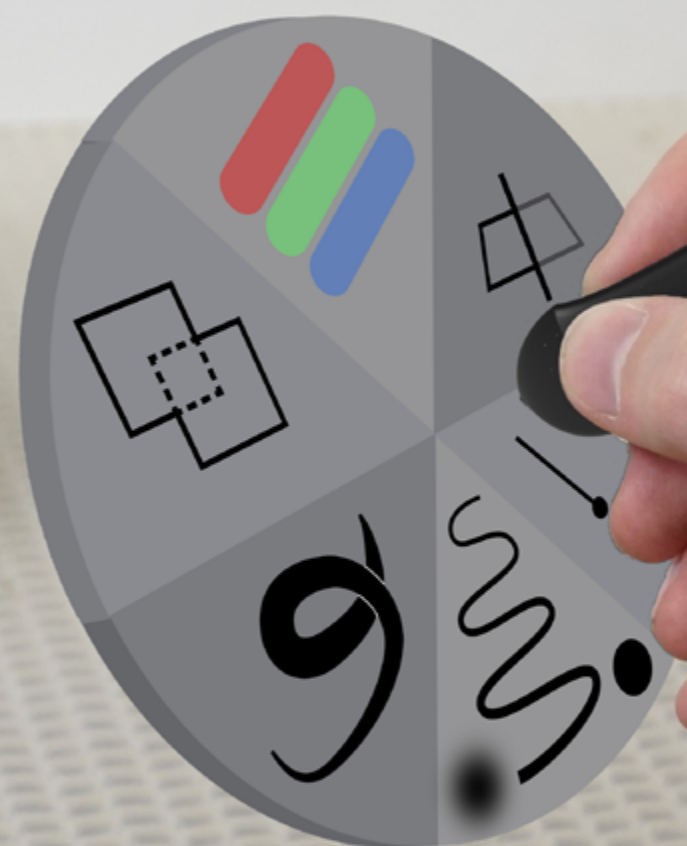
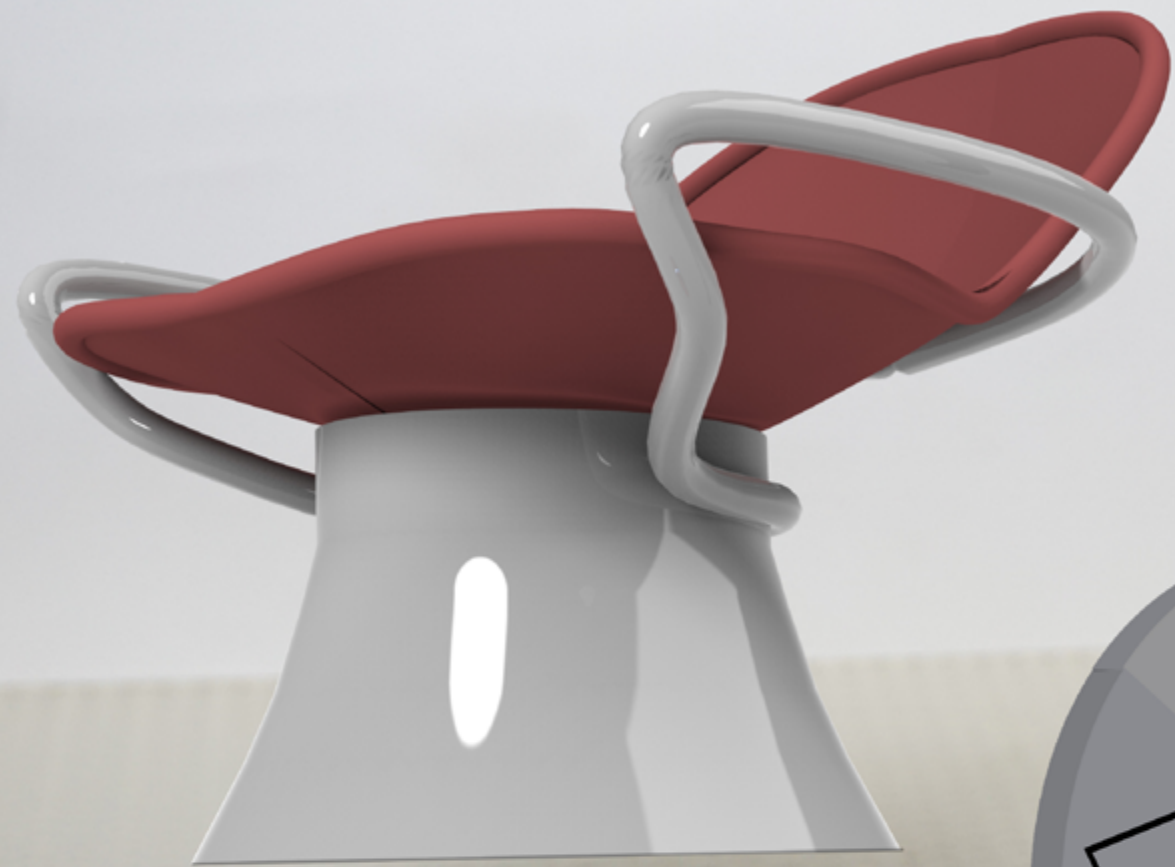
	Measure	Measures real and virtual objects and reference measurements later.
	Revolve	Creates faces or solids which revolve around a central axis.
	Select	Selects objects, shapes, and faces to move, change settings, delete, or group them.
	Paint	Draws in 3D space, with variable brush sizes, colors, and shapes.
	Primitive	Creates rectangular prisms, cylinders, cones, spheres, and other primitive 3D objects.
		Minimize menu



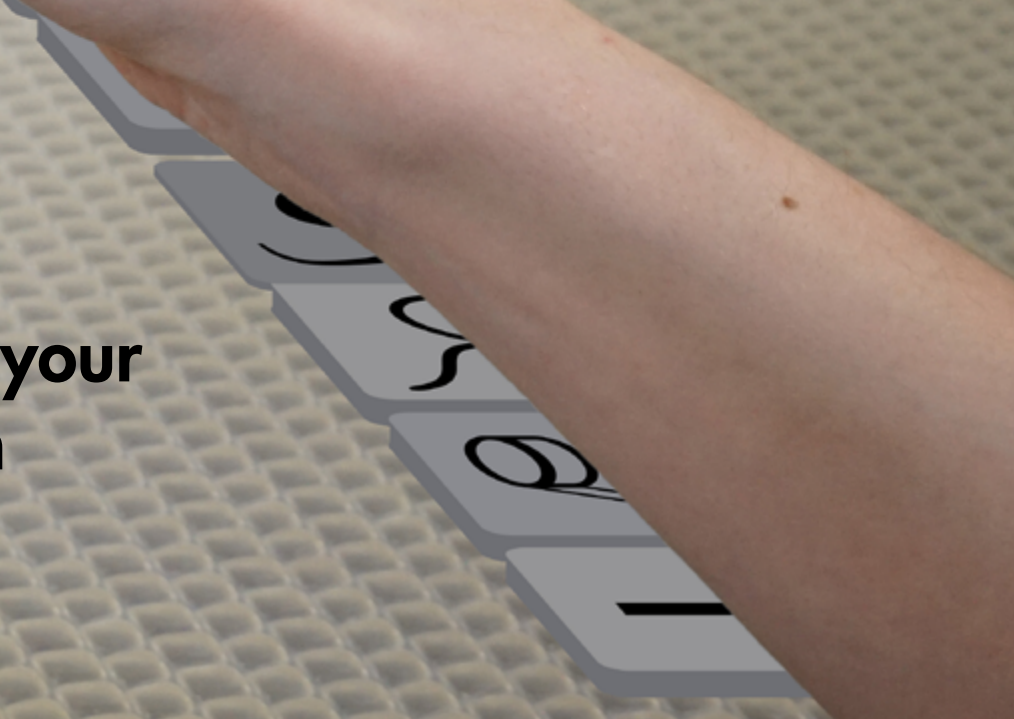
Desktop menu stays out of the way, while still being within reach







**Context menus appear right at your finger tips and disappear when you're finished with them.**



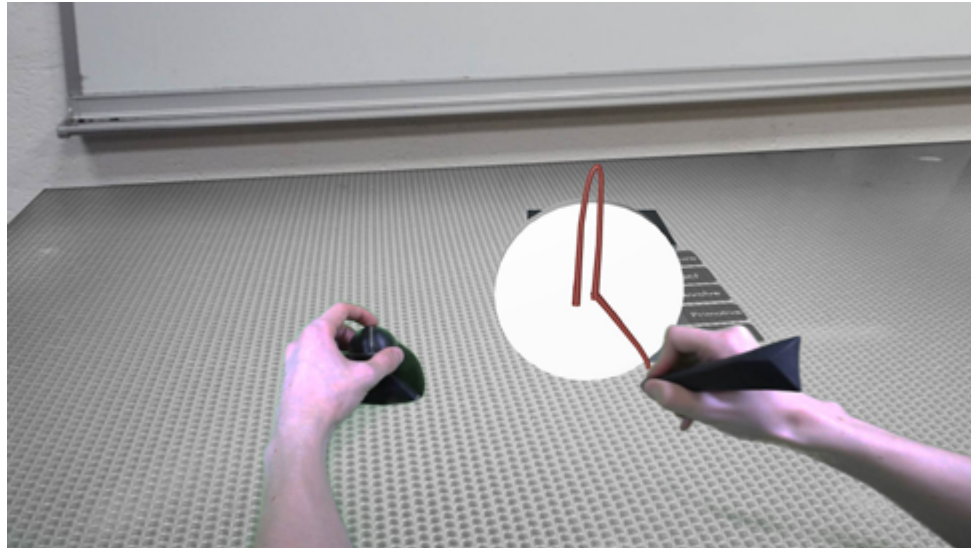


# Reuleaux Features

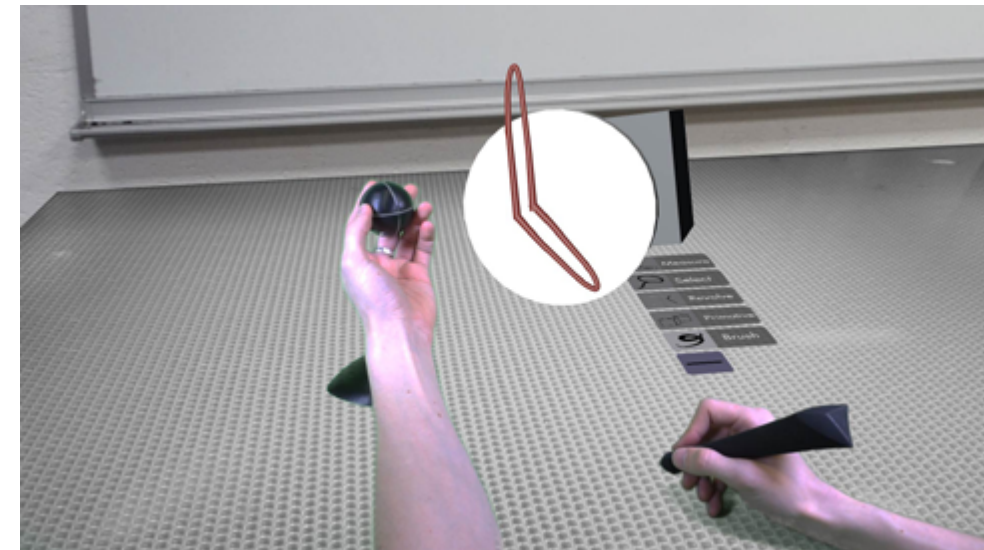
For a better demonstration of the user interface and features: watch the [Reuleaux demo video](#).

For more in depth details about my design process and insights, check out my complete [senior thesis book](#).

## Independent



Rapid creation of 3D sketches and models



Independent, simultaneous control of model orientation and virtual tools

## Collaboration



Enables mistakes to be easily fixed or undone



Rapid iteration and collaboration

## Demonstration



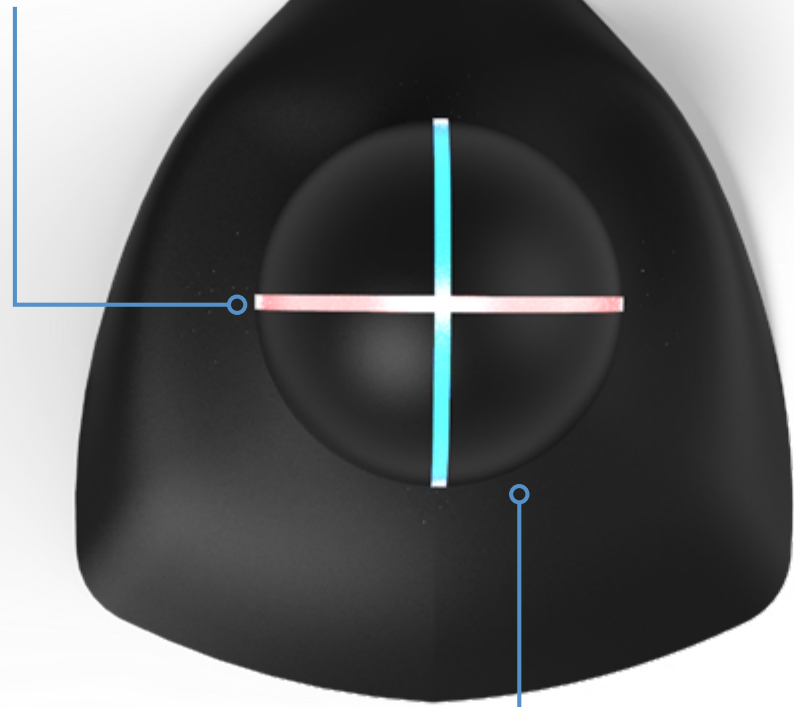
Demonstrate accurate scale and proportion in 3D



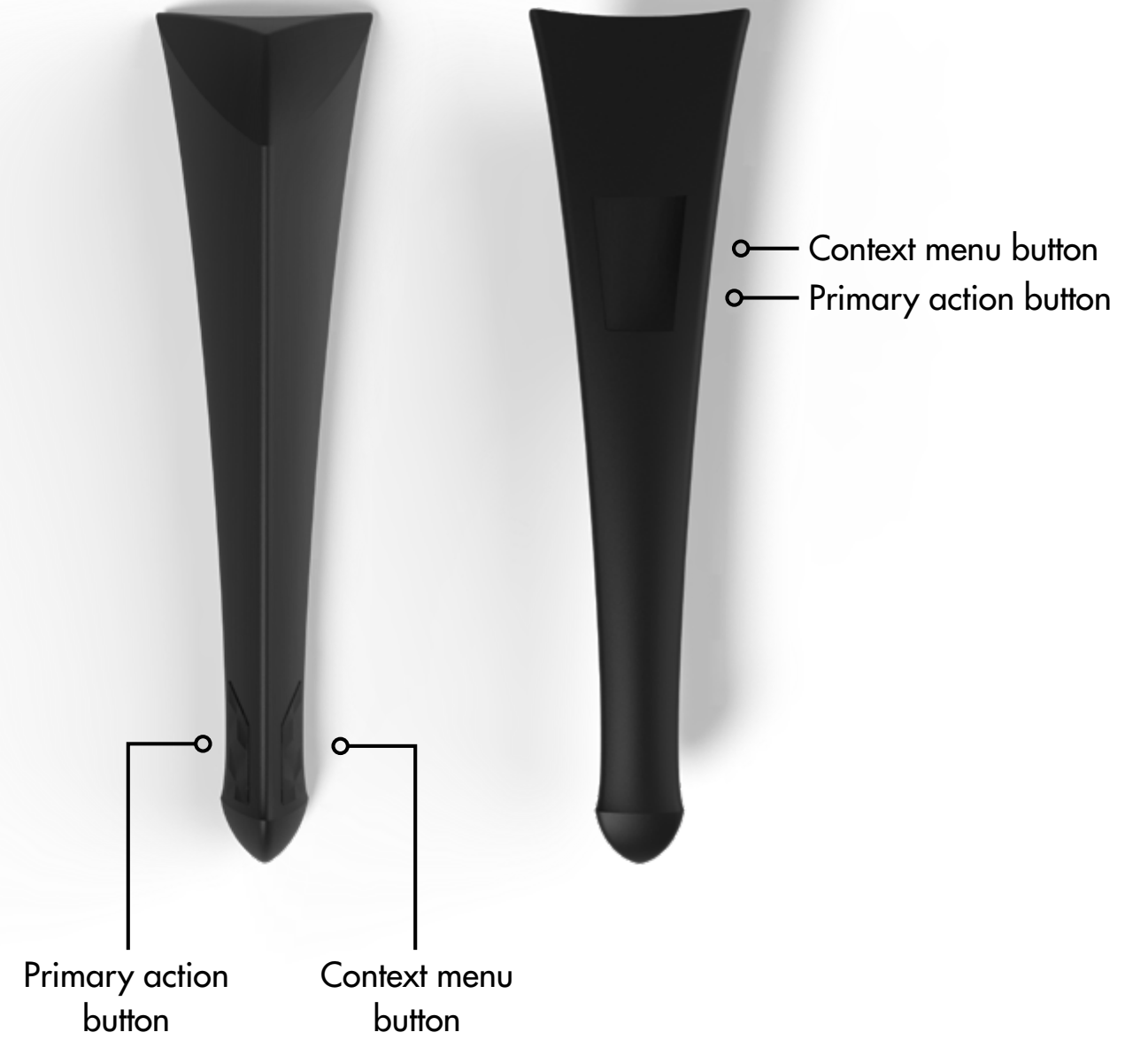
Demonstrate interaction and functionality of models

# Buttons and Interaction Points

LEDs indicate XYZ orientation



Tap enables and disables tracking

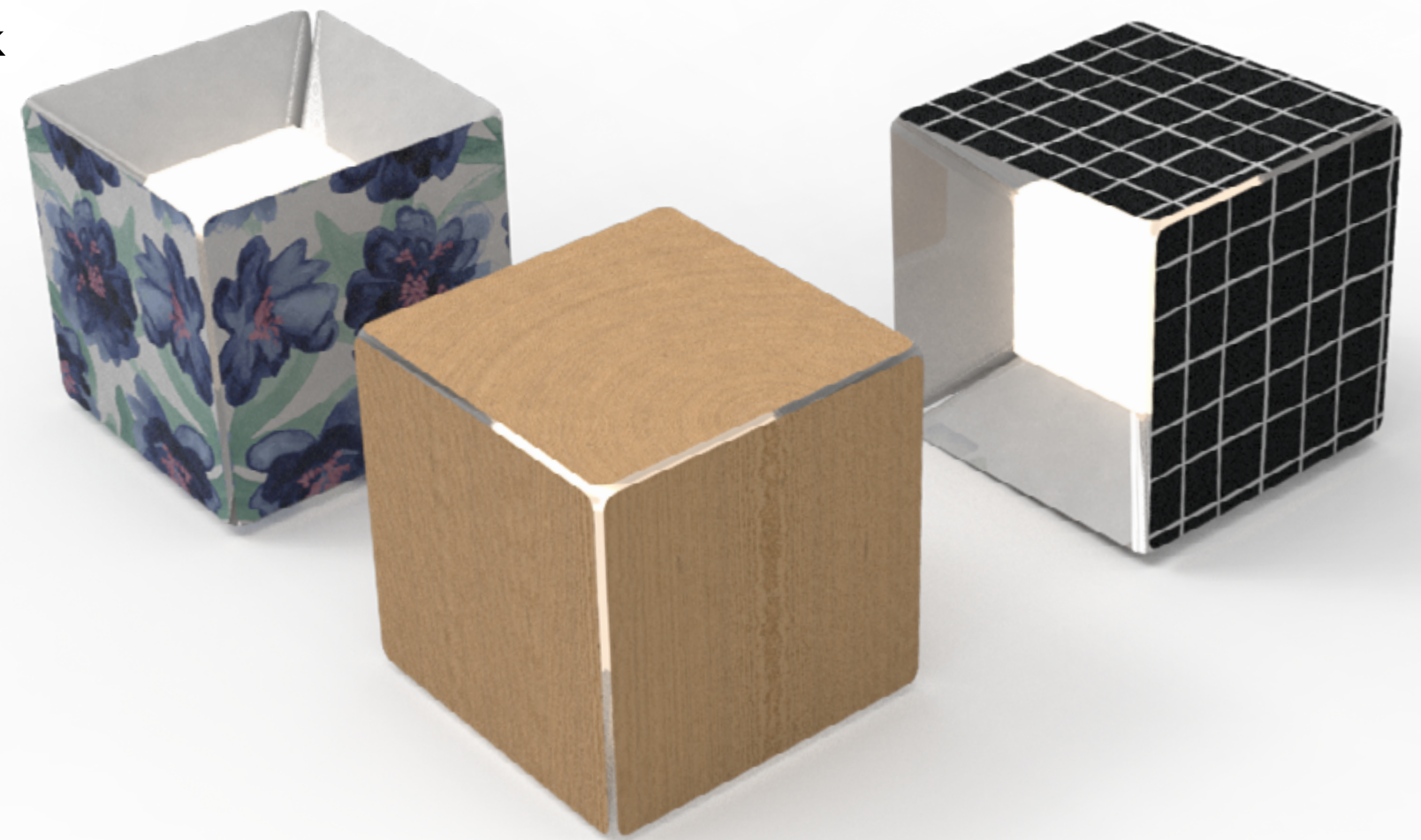




# *Room Essentials Lighting*

A collection of decorative lighting designed for Target

- Designed during my 10-week Target internship
- Sold in 1,800 Target locations Fall 2018
- Worked collaboratively with Target's in-house cross-functional lighting team
- Each product was designed as a platform to offer customers the option to mix and match their own look



# Project Brief

Design a lighting collection that is **effortless, functional, affordable, and stylish.**



- **Research** current trends, develop concepts, and design a series of products for the Room Essentials brand for the Back-to-College season of 2018.
- **Collaborate** with lighting designers, engineers, buyers, and sourcing managers to develop products which are functional, manufacturable, and cost effective.
- **Communicate** design objectives to vendors to create manufacturing samples.



# Trend Profiles

Target's trend team created 8 customer profiles for the 2018 Back-To-College season. These profiles allowed teams designing furniture, lighting, and other home goods to create a cohesive collection which appeals to a variety of customers. These profiles are meant to be starting points which allow customers to mix and match to achieve their own unique style. **I designed each product as a platform which could fit each profile by applying different colors, patterns, or icons.**







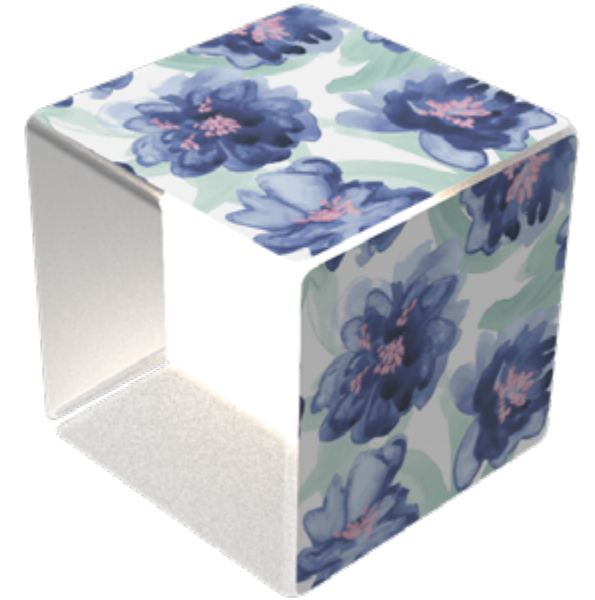
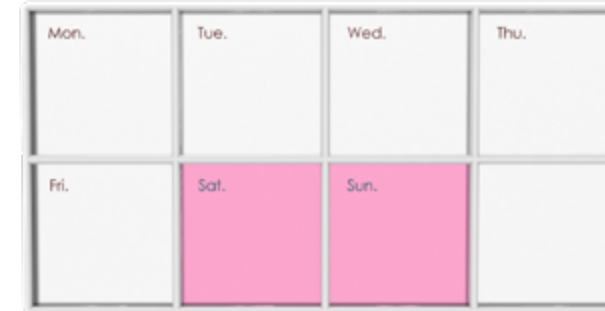
## IT GIRL

**Who?**  
The Neo-Girly Girl

**Major:**  
Fashion Marketing

**Style:**  
Feminine, Sophisticated,  
Stylish

**Likes:**  
Molly Ringwald movies,  
donuts with extra sprinkles,  
millennial pink, Glossier  
makeup, and flirty florals



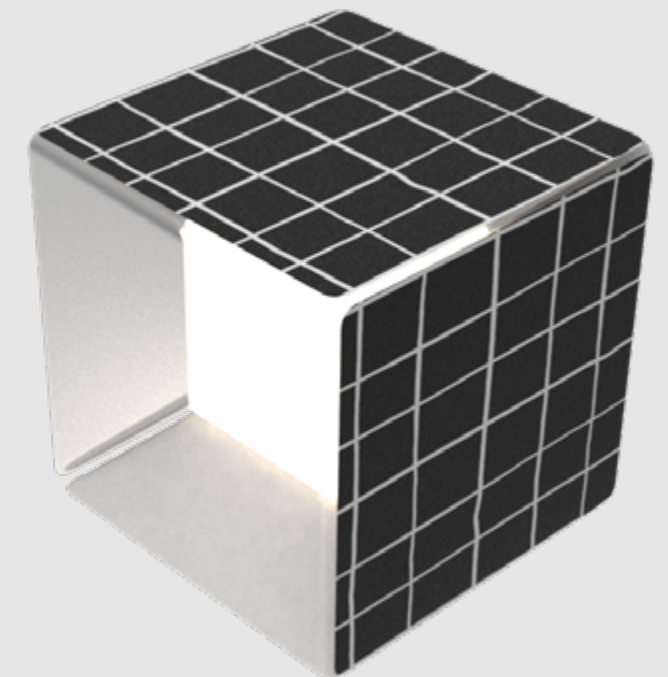
## ALPHABET CITY

**Who?**  
The Statement-Maker

**Major:**  
Marketing + Graphic Design

**Style:**  
Bold, Unique, and Graphic

**Likes:**  
Polaroid cameras, old-school  
Composition notebooks,  
making lists, being authentic







## MODERN WORKSHOP

**Who?**  
The DIY Dude

**Major:**  
Engineering + Industrial Design

**Style:**  
Modern, Simplistic, Nostalgic

**Likes:**  
Biking to class, black coffee, thrifted denim jackets, and making things his own



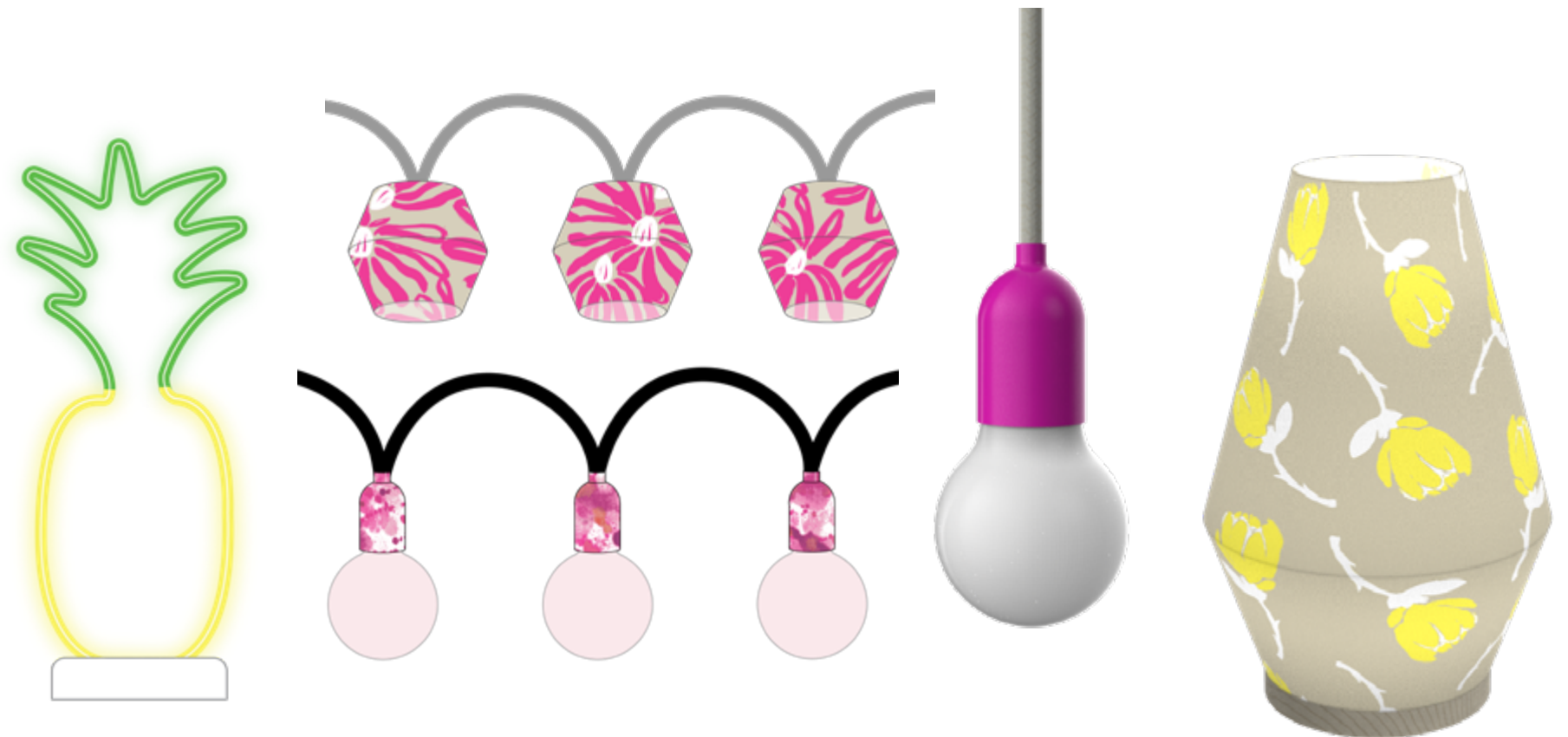
## POP!POP!POP!

**Who?**  
The Customization Queen

**Major:**  
Biology

**Style:**  
Colorful, Playful, and Quirky

**Likes:**  
DIY projects, succulents, bright colors, and standing out in the crowd







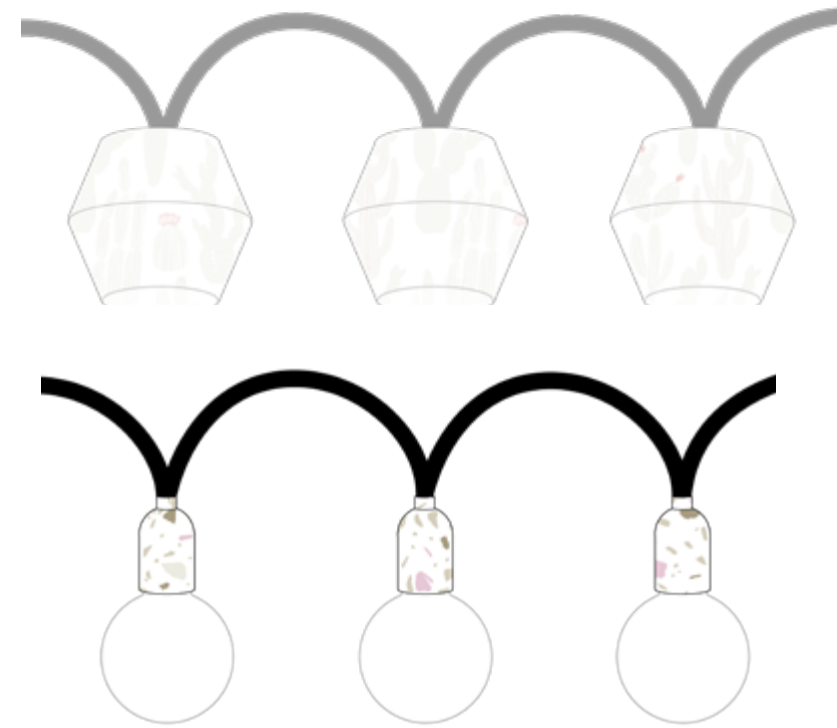
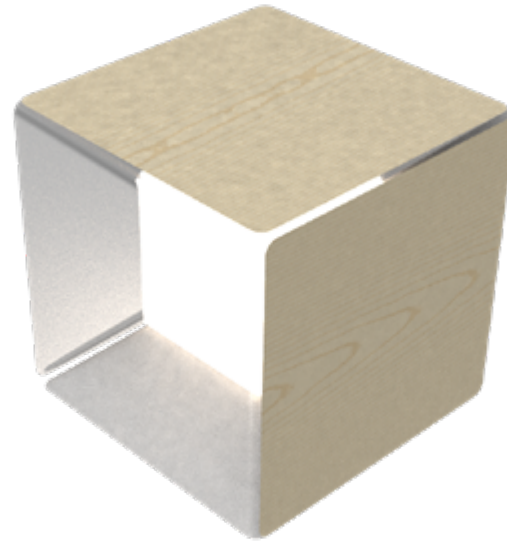
## UNPLUGGED

**Who?**  
The Free Spirit

**Major:**  
Art History

**Style:**  
Relaxed, Bohemian,  
Feminine

**Likes:**  
Experiencing nature, cozy  
socks, lots of embellishments,  
outdoor concerts, and classic  
novels



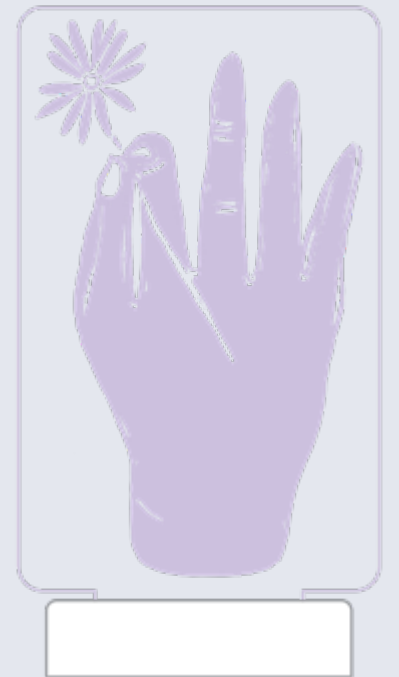
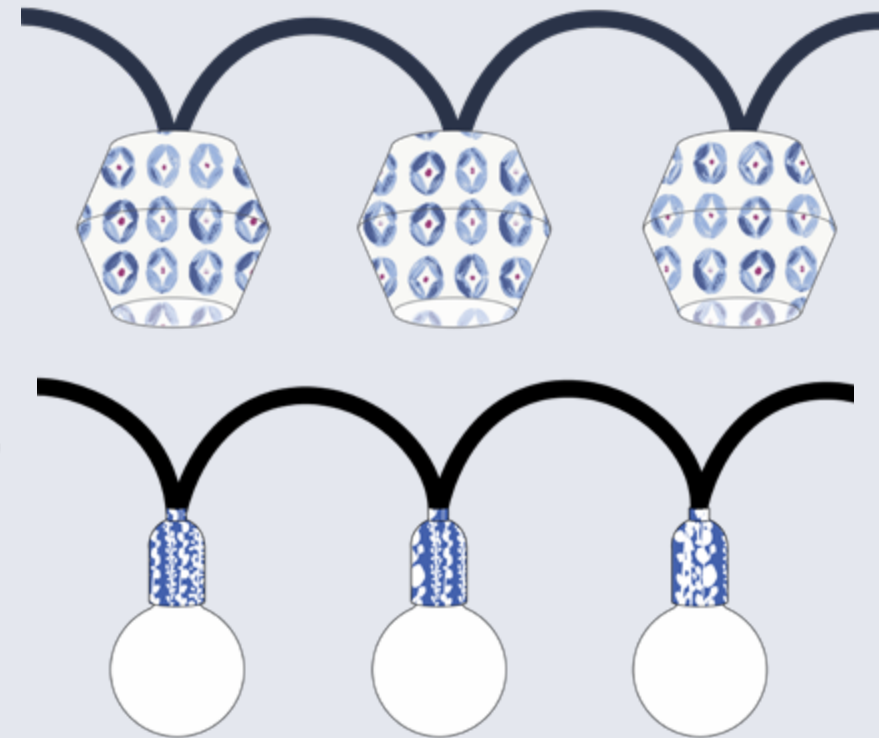
## SANTORINI

**Who?**  
The (Daydream) World  
Traveler

**Major:**  
International Business +  
Marketing

**Style:**  
Whimsical, Global, and  
Refined

**Likes:**  
Reading travel blogs, food  
truck festivals, painting with  
her watercolor set, and  
daydreaming







## DESERT ROSE

### Who?

The Rugged Bohemian

### Major:

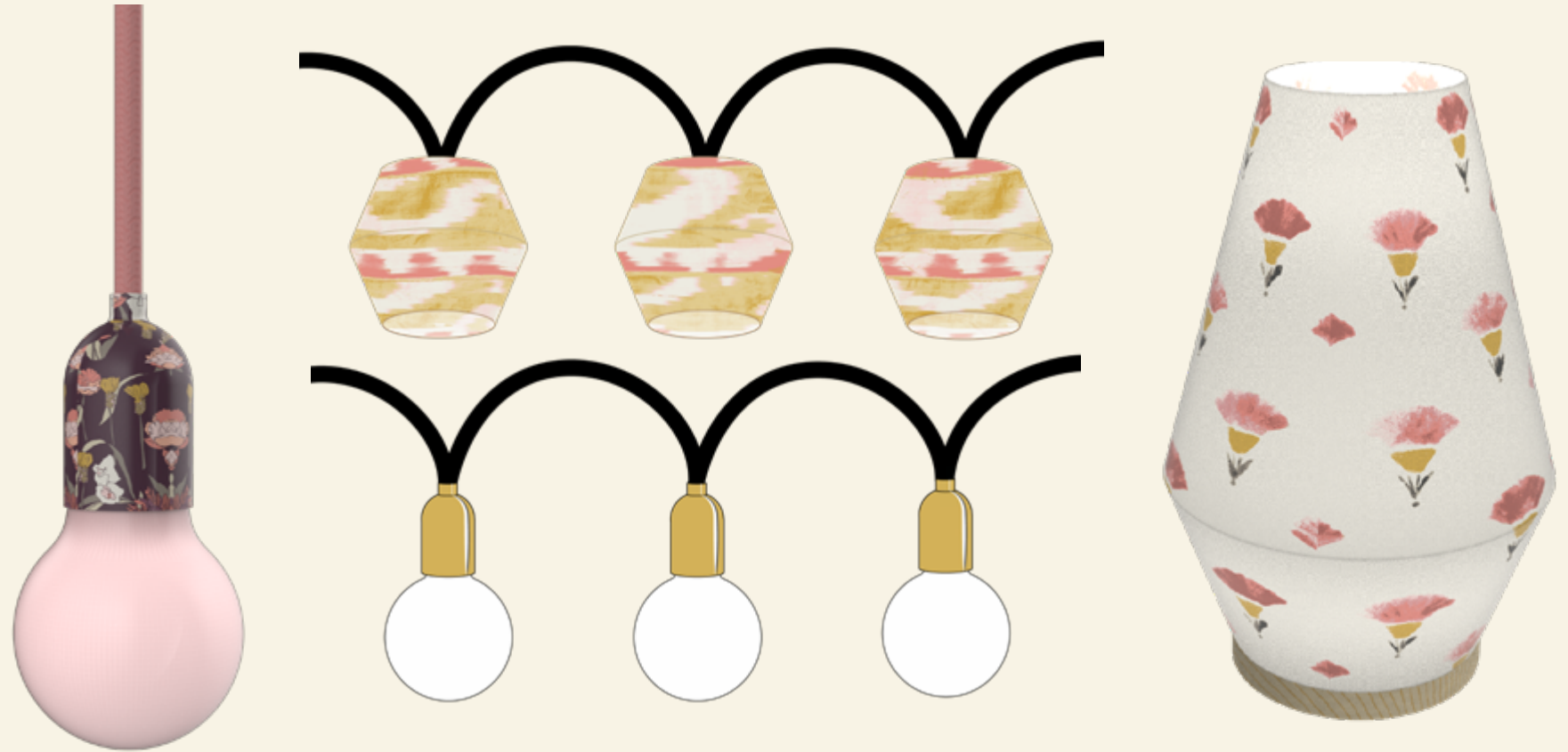
Creative Writing

### Style:

Boho, Global, Vintage

### Likes:

Traveling, Triting in her dream journal, flea markets, old vinyl records, and stealing her boyfriend's band t-shirts



## GO BANANAS

### Who?

The Style "Icon"

### Major:

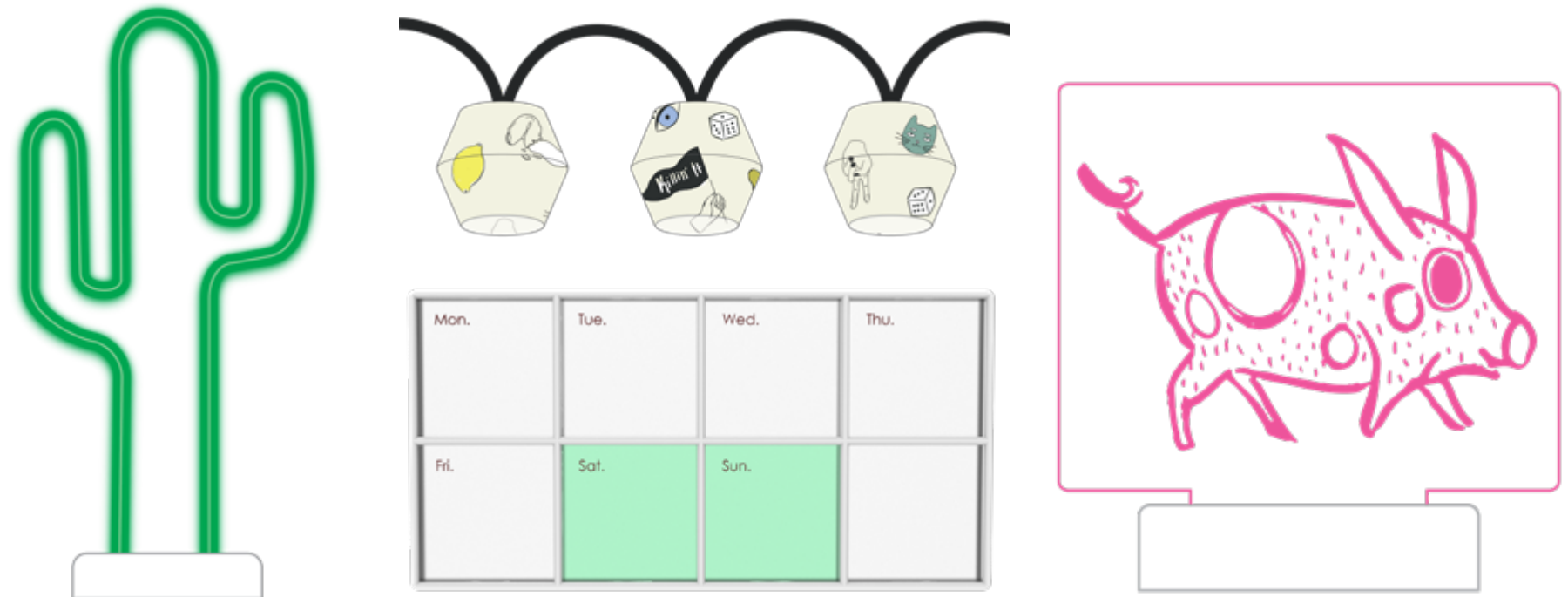
Advertising

### Style:

Quirky, Curated, and Graphic

### Likes:

Matcha lattes, doodling instead of taking notes, VANS sneakers, pins and patches, and 90's sitcoms











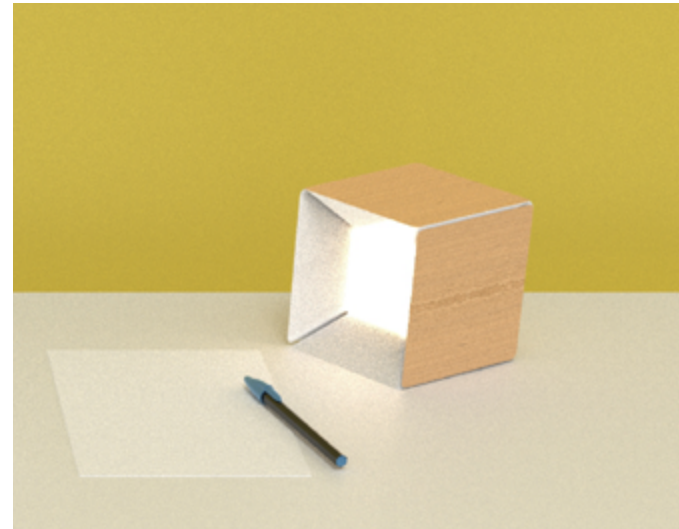


# Design Objective

## Product Information

### Ambient LED Cube Light

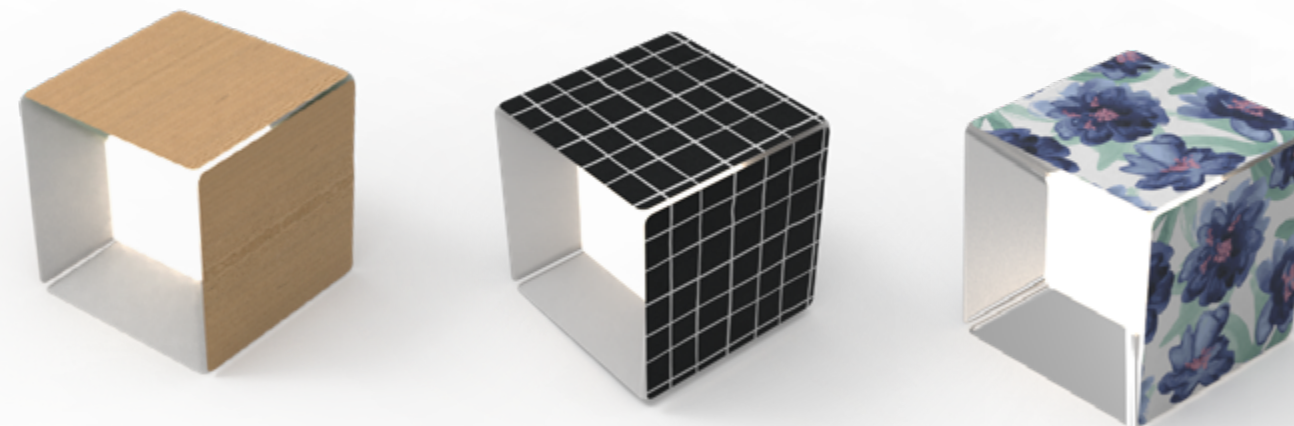
- Body Material: Opaque plastic printed with colors and patterns. Wood finish should use a Topan paper foil
- Center Material: Translucent white plastic.
- Light should be diffused evenly with no hot spots from individual LEDs
- Cube has 5 panels around the outside with 1 side open. LED enclosure in the center emits light out between the edges of each panel and out of the 1 open side.
- Rechargeable battery with USB cord
- On/Off Switch
- "Try me" feature on packaging



Target Rendering for reference of lighting effect



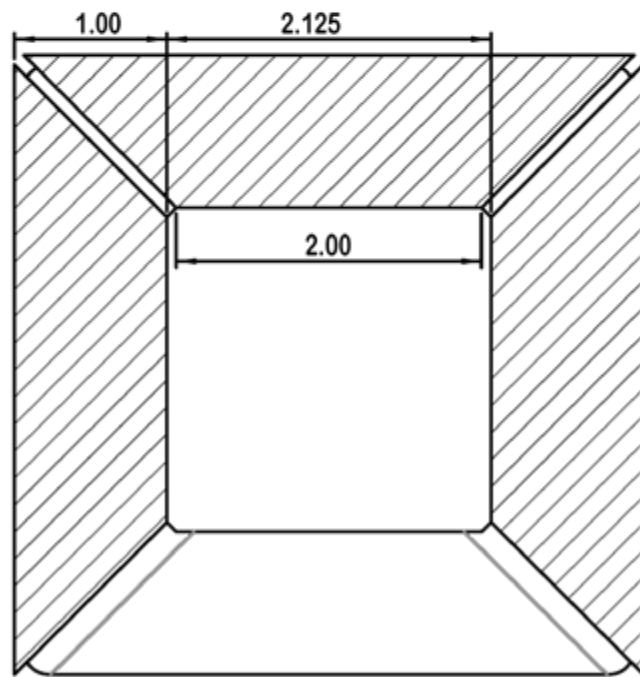
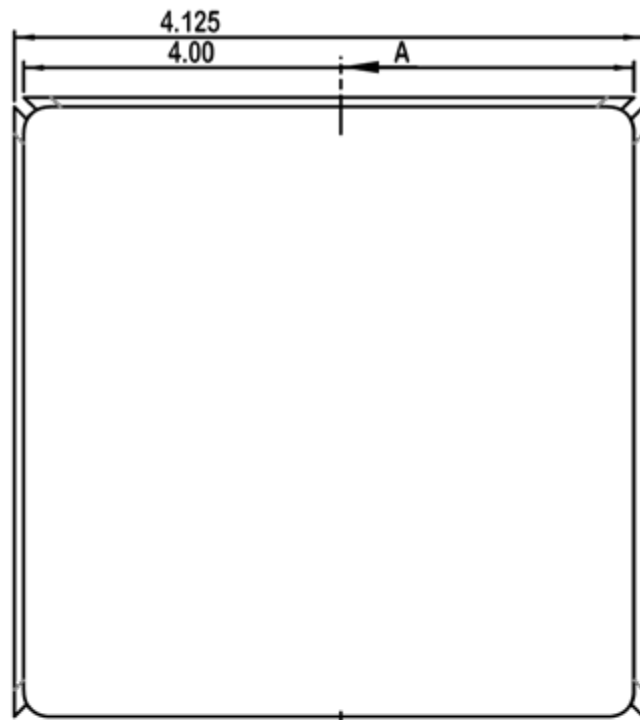
Image for reference of lighting effects



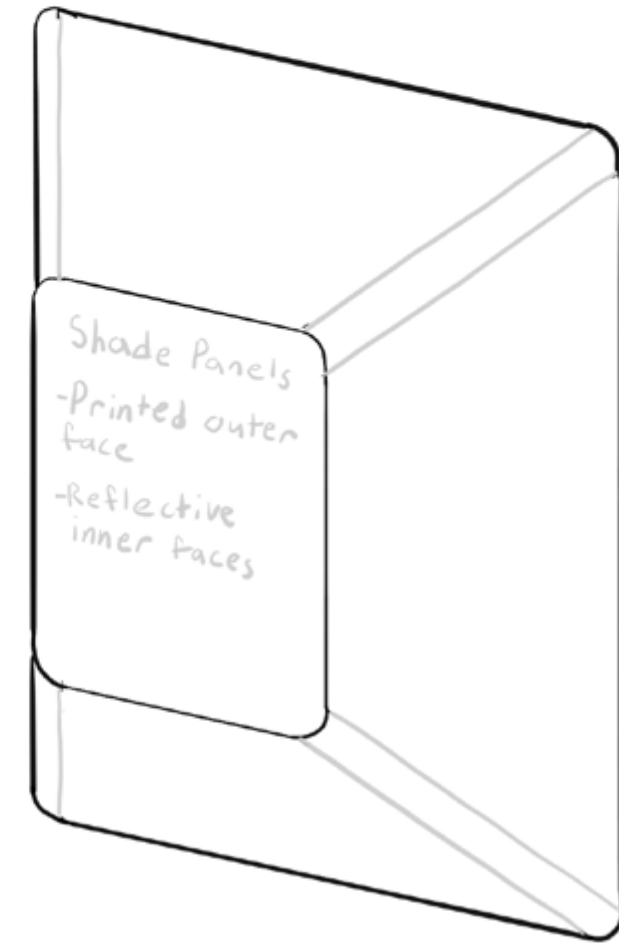
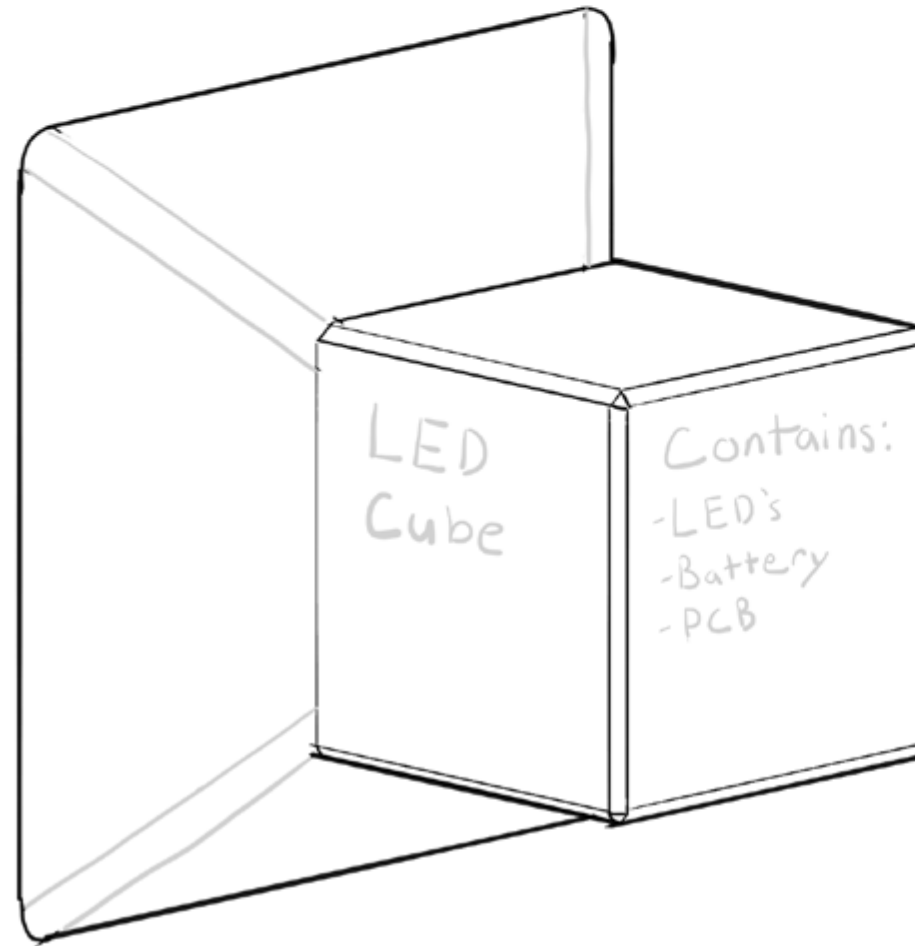
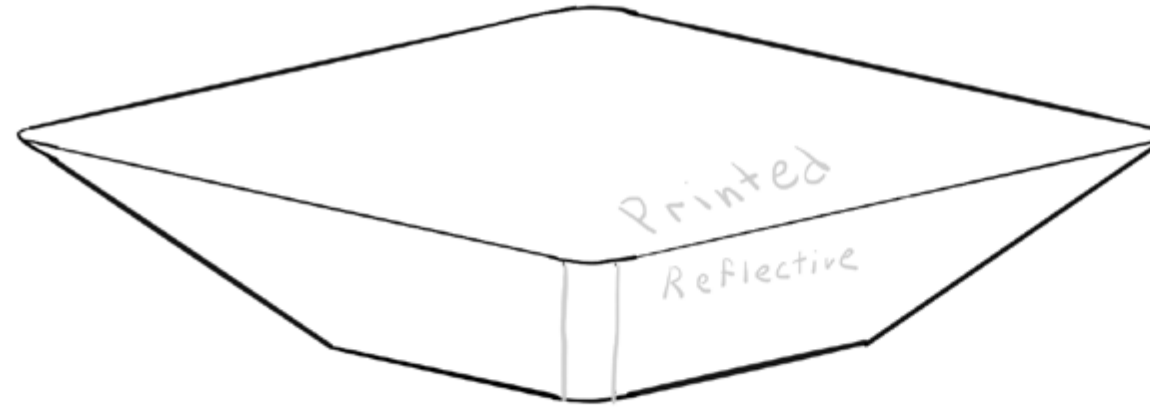
Target renderings for color and scale of patterns

The final deliverables for this project were Design Objective documents for each SKU. These documents are made up of design intent drawings, reference images, pattern files, and a detailed description of the product's manufacturing requirements. I sent these objectives to a selection of vendors to create manufacturing samples.

# Key Features



SECTION A-A  
SCALE 1:1



# *Rotary Grater*

An ergonomic cheese grater for the home kitchen

- Designed for my mother, Ingrid
- Fixed pain points she found with her current grater
- Made the kitchen experience comfortable, efficient, and frustration free





# Client



## Ingrid Miller

- Mother of three
- Known for her eclectic fashion and creative cooking
- Never follows a recipe to the letter, always adds her own spin
- Makes herself at home in any kitchen, but is most comfortable in the one she has designed for herself
- Picky about tools and ingredients



# Current Grater

## Ingrid's Pain Points

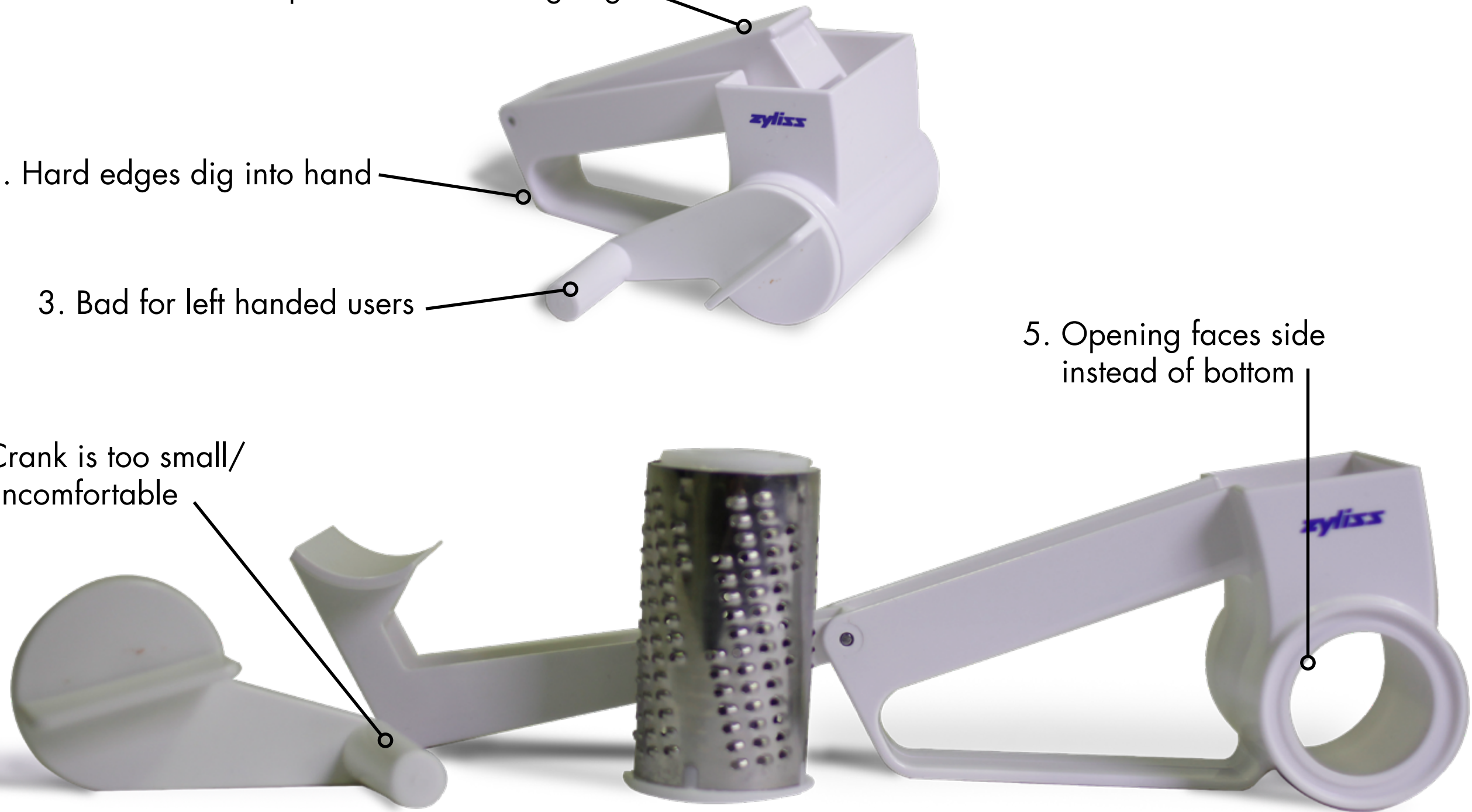
1. Grip with thumb is fatiguing

2. Hard edges dig into hand

3. Bad for left handed users

4. Crank is too small/  
uncomfortable

5. Opening faces side  
instead of bottom



Zyliss Rotary Cheese Grater

# Market Analysis

There are some products already on the market which address these pain points, usually called “Cheese Mills”, but they have their own functional and ergonomic issues.



Microplane

“...can only put in a **very small amount of cheese**. It has to be refilled if more than one person is dining.”



Cuisinart

“**Broke after a week’s use**—plastic cracked... Not very well designed. Cuisinart used to be a reputable brand—this just felt like a piece of Chinese junk.”



Westmark

“this grater is **difficult to use**. It requires the user to push down quite hard while you turn the top handle.”

# Market Opportunity

There is a gap in the cheese grater market between the traditional rotary grater and the “pepper mill” style graters. An ideal grater would have comfortable silicone grips, a vertical grater orientation, and use finger strength to press the cheese against the grater. No such grater currently exists on the market.



With a vertical grater orientation, cheese falls naturally out of the grater, instead of getting stuck or requiring the user to twist their wrists.



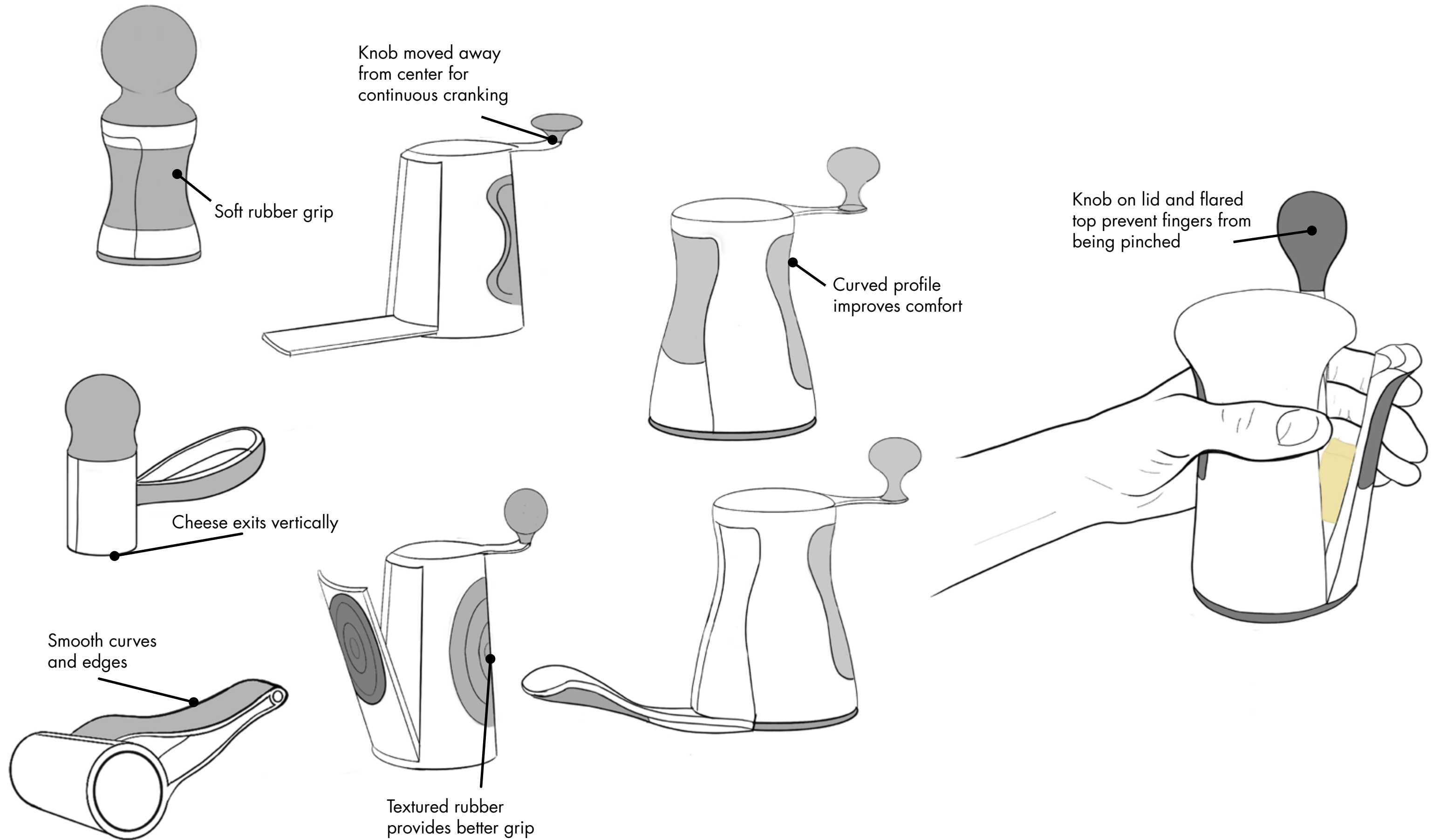
Soft silicone grips make the grater more comfortable to hold, and are less fatiguing over a long period.



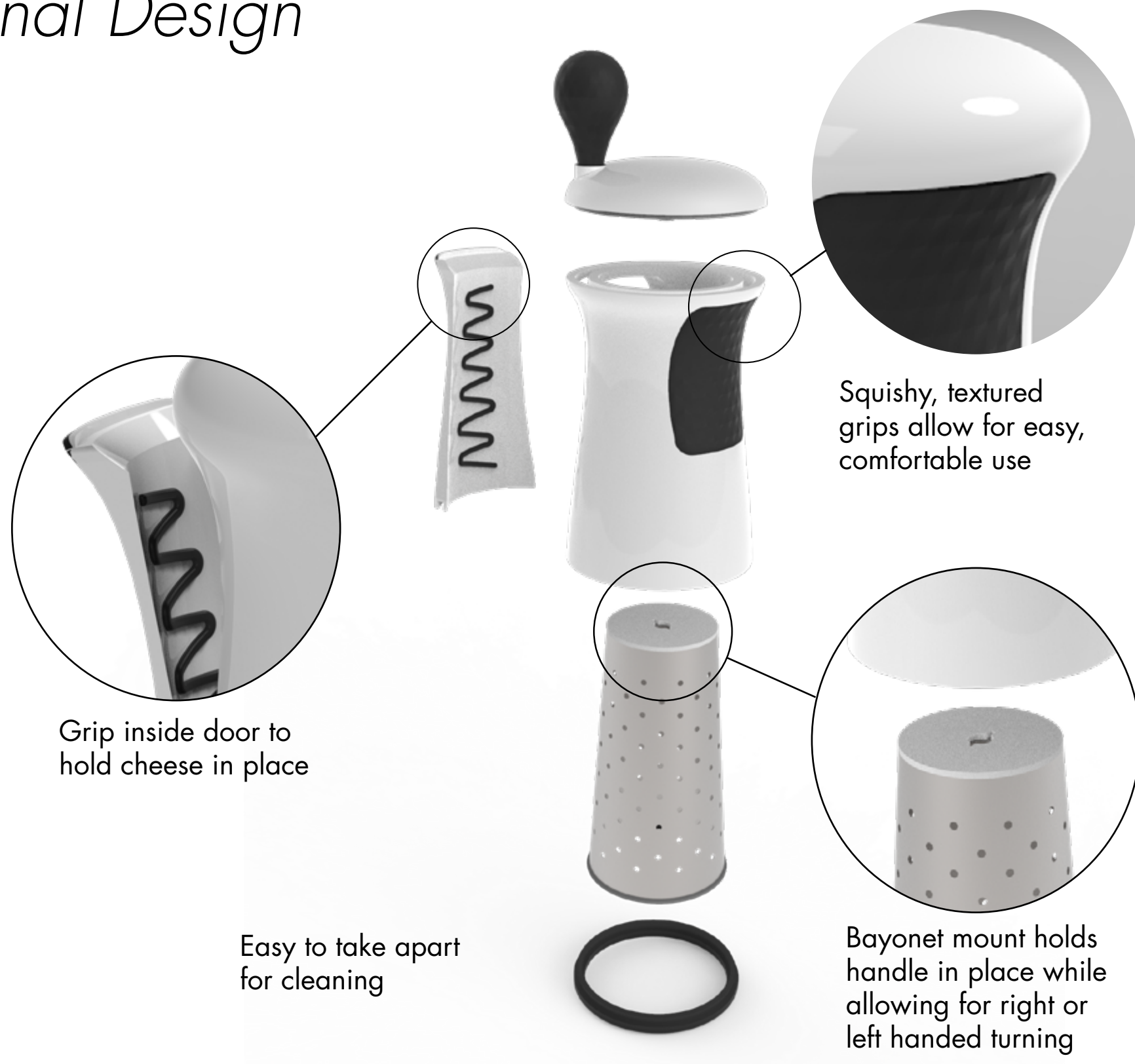
By utilizing finger strength instead of thumb strength, it is easier and less painful to put continuous pressure on the tool.



# Ideation



# Final Design



- Stretchy elastomer band acts as a spring to hold door closed.
- Door acts as a long lever to easily push cheese against grating surface.
- Elastomeric grips denote clear hand placement
- Flared grip keeps fingers away from spinning handle

# *Robern Cartesian Vanity*

A premium bathroom vanity to overcome limited mobility

- Designed for customers with limited reach, balance, and strength.
- Provides stability, comfort, and confidence in the home bathroom.
- Follows ADA Guidelines while retaining premium materials and appearance.





# Market Opportunity



- Seventy year old married retiree and grandmother
- Planning her "forever home"
- Enjoys traveling
- Suffers from arthritis
- Doesn't like things that make her feel "old"



**57%**

of individuals over 65  
have arthritis



**70%**

of individuals over 65  
develop disabilities

# Current Choices



## Accessibility

- + Grab Bars for stability
- + Room for wheel chairs and walkers
- Cheap plastic and brushed aluminum
- Often added as an afterthought



## Luxury

- + Premium materials like marble, extruded aluminum, and glass
- + Carefully planned and designed
- Hard edges and slippery surfaces
- Not laid out for wheel chair accessibility



# *Full-Scale Prototypes*





# Vanity Features

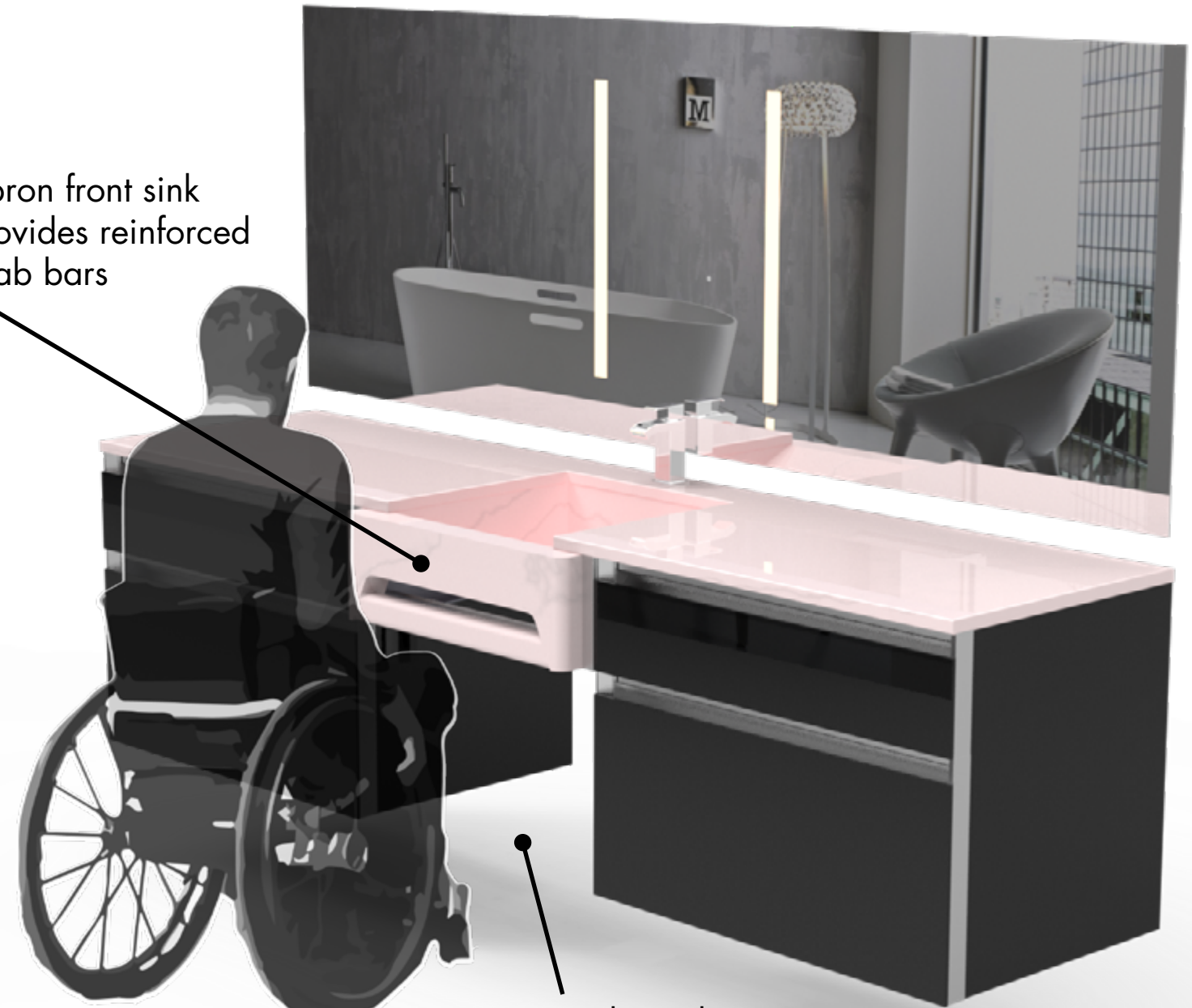
Door mounted  
medicine cabinet  
brings storage  
within reach

Modular shelving  
is easy to adjust  
for personalized  
storage



Apron front sink  
provides reinforced  
grab bars

Space under sink  
allows for wheel  
chair access





# Circadian Rhythm

Adjustable temperature lighting is implemented into the AiO mirror to improve sleep patterns and to stabilize the personal body clock



# Pricing

Robern specializes in modular vanity systems which can be customized to each customer's preferences and budget. I collaborated with business and marketing students to design a vanity system which could be profitable and competitively priced.



## Standard

- Single front grab bar
- Single Robern AiO mirror
- Single in-wall storage

### Estimated Material Cost

\$700.54—\$878.36

### Estimated Retail Price

\$4,701.99—\$5,852.99



## Master

- Single front grab bar
- Single Robern AiO mirror
- Double in-wall storage

### Estimated Material Cost

\$1,058.53—\$1,372.18

### Estimated Retail Price

\$9,837.99—\$12,748.99



## Flagship

- Double front grab bar
- Double AiO mirrors
- Double in-wall storage

### Estimated Material Cost

\$1,299.99—\$1,768.72

### Estimated Retail Price

\$13,171.99—\$17,917.99



# *Interactive Photography Display*

Designed and fabricated for The Sigal Museum

- Part of a project to digitize the glass plates of photographer Norma Collmar
- Designed on a limited budget using grant funding





# Brief

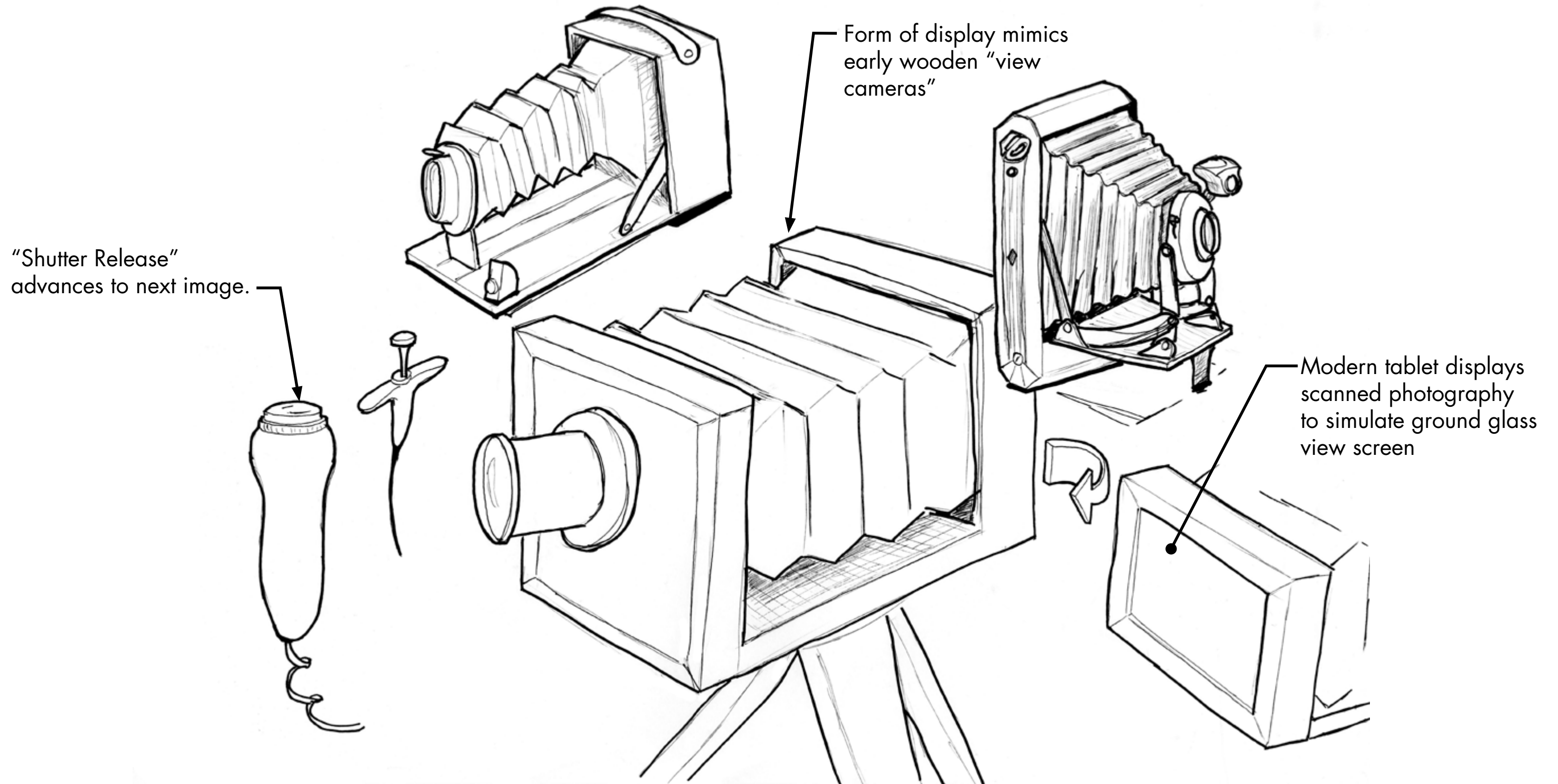
The Sigal Museum wanted to create a way to engage patrons in the experience of viewing century old glass plate photography





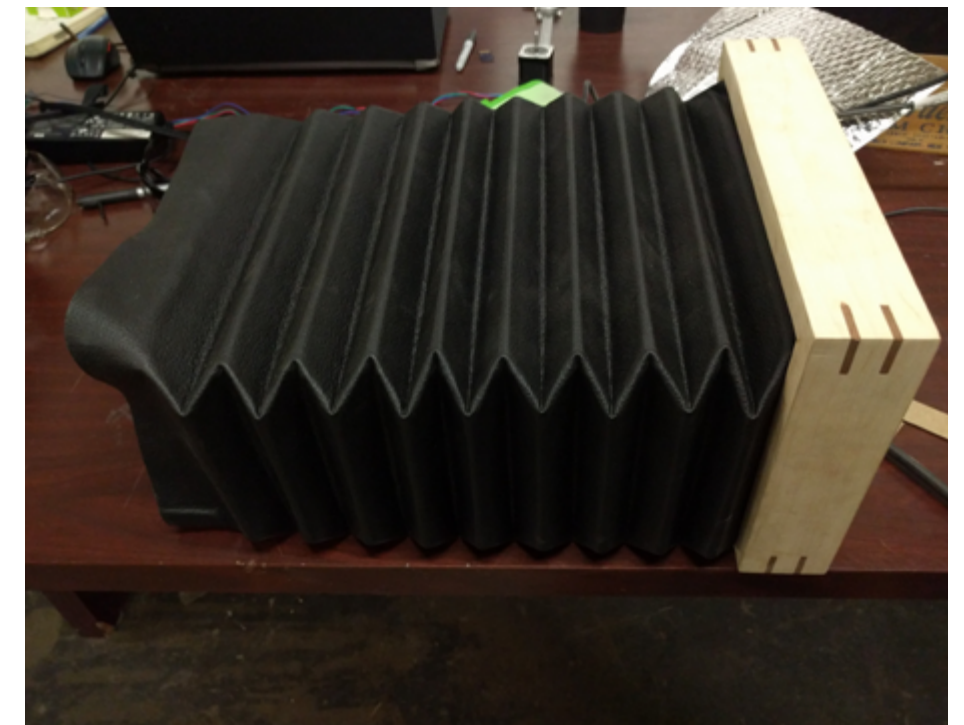
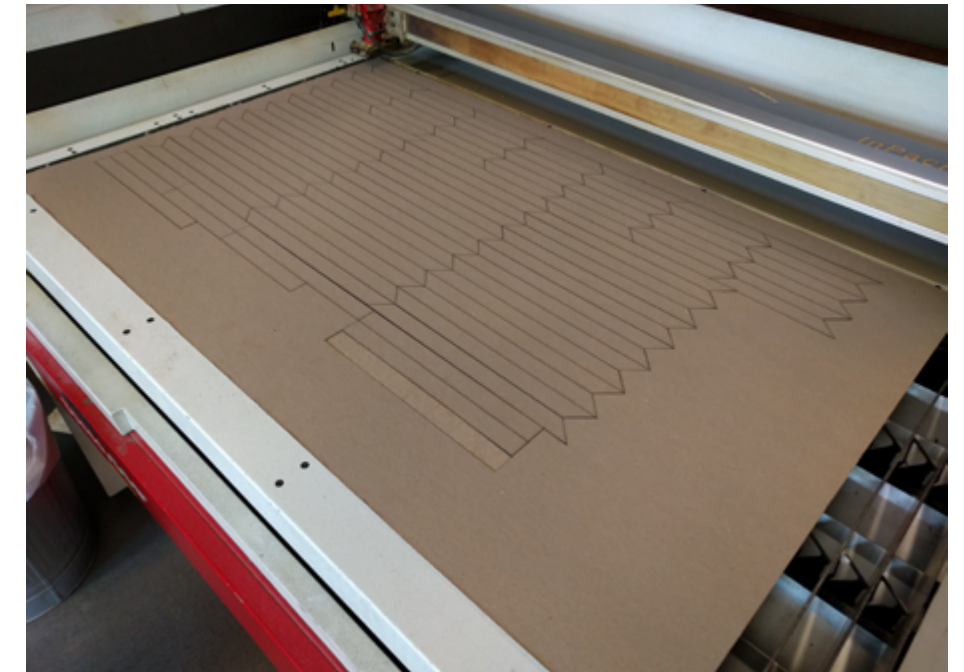
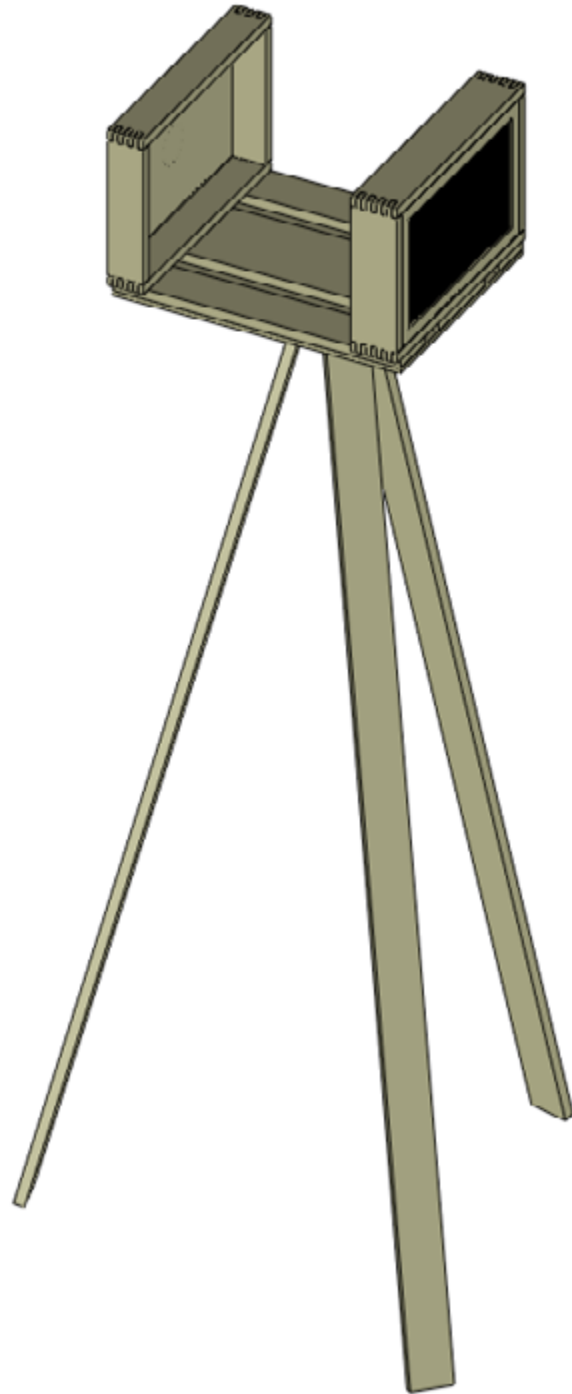
# Concept

To create an interactive camera exhibit to put the museum patron in the shoes of the photographer



# Fabrication

The wooden camera frame was fabricated using traditional joinery techniques, while the bellows were modeled and lasercut for a precise fit. The "shutter release" was custom made to control the tablet display while matching the time period of the camera.





# Final Exhibit





# *Projects with Oat Foundry*

Custom signage, table settings, and decor



- Work done with Oat Foundry during the Summer of 2016
- Burts Bee's letters made to hold fruits and vegetables to be displayed at a brand event
- Candle Sticks are currently in use at Le Coucou, a Stephen Starr restaurant in NYC



# *Burt's Bees Sign*

The Oat Foundry team had only 4 days to design, fabricate, and delivered this massive signage in time for a Burt's Bees brand event. The letters were made of CNC cut MDF and lined with over 500 individual pieces of reclaimed wood lath from West Philadelphia. The final touch was a coat of paint in Burt's Bees signature color.





# Le Coucou

The Starr Restaurant Group approached Oat Foundry to construct and fabricate 50 unique candle stick holders for their Le Cou Cou restaurant in NYC. Oat Foundry worked with design firm Roman and Williams to align the candlesticks with the rest of Le Coucou's decor. To create the desired look parts of salvaged antiques were used in addition to custom modeled parts. The form was then broken down into components which could be used to create silicone molds and then cast in pewter.

