# Bee:

# An Interactive Installation

## Style Guide

# The Bee

Good!

Too dark/noisy texture

Too realistic,
losing silhouette

Too simple/stylized

**The bee is the main focus of the composition. The design should be detailed enough to draw attention, but not overly complex. Some simplification of shapes and stylization is good, but not too much. Texture should very limited with predominantly flat shapes.**

**Because it is the focus, the bee silhouette should be strong and instantly readable.**

**Highest level of detail fidelity and contrast should be reserved for the bee. Notice how the light value of the wings helps direct attention back into the bee, contrasting against the dark body.**


**The style of the bee illustration is reminiscent of street art and print graphics. These examples by Blek le Rat[1] (left) and Shepard Fairey[2] (right) are good indicators for the feel and level of detail. Rather than lines to describe form, think shapes. Interior color is typically flat or gradient.**

# Foreground Elements

The images of plants are sourced directly from my own personal photographs. Reduced to silhouettes and filled with a gradient, they retain a similar print graphic quality used in the bee, but with less interior detail or outlining. The flat silhouette quality helps pull them off the more textured backgrounds and reduces competition for detail with the bee.

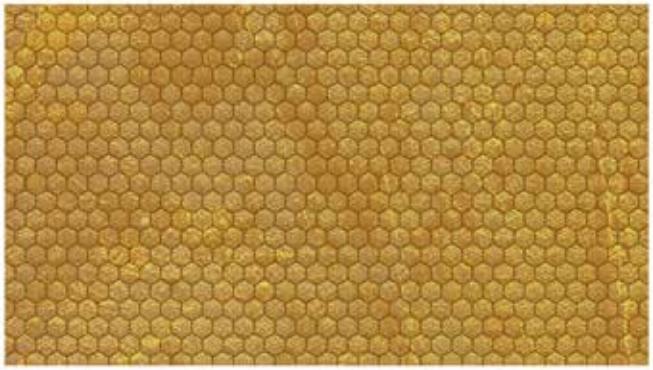


The radial elements in the foreground are used primarily as framing devices for the bee. They also contribute to multiple layers of motion. When animated, they rotate at varying speeds. They have a little more texture and slight transparency. This reduces their visual importance and prevents them from competing with more important elements in the composition.

# Midground Elements

**Most of the midground elements are also sourced from my own photographs. The tree line and industrial structures are reduced to silhouettes and filled with either a gradient or flat color. This allows them to visually separate from the more textured backgrounds and helps establish a stacked or layered sense of depth. The flat or gradient fill reduces visual competition with the bee, like the plants in the foreground. This subject matter and style of layering for depth is a technique I've explored in previous paintings, as seen below.**

# Background Elements



The hive background was created using a hexagon hive-like pattern with a fairly noisy tree lichen texture overlay. This texture overlay helps to add visual interest and a little randomness to the pattern. It is important that the textures in the background be fairly evenly distributed and small enough detail so as not to distract from the other elements. When the flat shapes of the mid and foreground are layered over these backgrounds, the visual noise of the texture helps separate the layers.

This background uses the hexagon hive-like pattern again, but this time the texture comes from a found blueprint with mechanical drafting marks. The marks are small enough so as not to distract from more important elements. Much like the lichen texture, the noise and color variation in this overlay help separate the background from the shapes layered in front of it.

The rolling clouds in this background help establish mood for this state of the installation. The movement of the background helps create a sense of unease and provides an added layer of motion to the animations. The stormy quality and color add an apocalyptic feel to the scene. The texture is larger and less even in this background, but the motion and variation in color and shape help separate it from the elements in front of it.

# Color

**Generally speaking, the colors used in all states of the installation are highly saturated. This is to compensate for variable light conditions, potential dimness or noise/color on projection surfaces. For example, if this installation was to be exhibited outdoors and projected on the wall of a building, there may be some loss in vibrance depending on the surface quality of the wall.**

**The colors used for the first state are vibrant and bright. They mimic a naturalistic coloration. For example, the gradient used on the pink flowers is similar to gradients naturally occurring on the actual plant. The trees are a deep green, and the hive is a warm, honey-gold color. The color of the bee is a bit more saturated in order to focus attention and separate it from the background. The light blue of the wings is used a device to focus attention on the bee by increasing contrast in value and maintaining silhouette. I wanted the wings to feel transparent, but without enough value, the silhouette begins to get lost. The same blue tones are repeated in the radial element framing the bee.**

# Color

**This state features the eventual poisoning of the bee and overall degradation of the more natural state. Colors used here are much darker and gloomier. The goal of color use is to create a sense of apocalyptic, industrial doom. The greens used are neon, bright and acidic. Think Mr. Yuck[3] stickers. This is also a common color used for acid in games, as shown below from Valve's *Left 4 Dead*[4] and *Diablo III* by Blizzard.[5] The trick here is making sure that the greens are saturated, yellowish and bright. Otherwise, green can also be confused with healing or nature. Making sure the green is read as a negative rather than a positive is key.**


# Color

**The blue tones in this state serve a number of functions. This state immediately follows the acid greens and chaos of the industrial state colors. In terms of color psychology, blue is perceived as having a calming and cooling effect. It is a color of dependability and trust.[6] In this state, players have to work together in order to repair the damage from the previous state. The color blue helps underscore this need for cooperation and trust between the users. Blue is also the color of the manuscript used for the overlay. This alludes to planning and concentration, both of which can be aided by the color blue.[7]**

**Blue is also a cold color. In this state, users work to repair the damage done previously and "revive" the bee. Using cooler colors reinforces the fact that the bee has not yet been fully restored to the warmer tones of the more natural state.**

# VFX

**Most of the animations are simple transformations- scale, position, opacity and rotation. But certain visual effects need to feel more magical. When designing these magical effects, some key words to keep in mind are sparkle, shimmer and glow.**

**The very first effects should feel magical and happy. This is the first sequence of interactions so it is important that the experience has a real sense of magic. The user is creating a bright and cheerful scene as plants are revealed.**

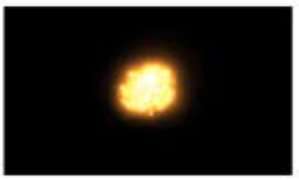
**Bright colors, lots of glow, lens flare and sparkling particles help establish this feeling of magic and wonder.**

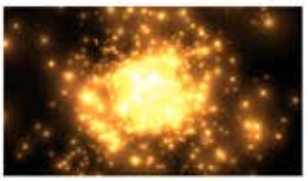
**Think Disney pixie dust and classic film intros.[8,9] Long streaming trails that follow bright orbs of light moving in a swirling and curving motion. Also, notice the amount of glow.**


# VFX

**The bee burst effect is a golden sparkling explosion- like glittering pollen bursting from shimmering bees. The tones are warm, but avoid looking too much like flames.**

**Example effect- lots of glow, random distribution of particles. Good sense of warm tones without being too much like fire.[10]**





**Flickering flash frames of inverted colors are used to emphasize the two major burst effects. This increases the visual impact of the effect and helps in pulling the user's/audience's attention up from the interface. Below is a sequence of a similar flash frame effect from Disney's *Pocahontas.*[11]**

# VFX

For the destructive effects, the goal is a corrosive spreading acid followed by a disintegration. The corrosion should look like singeing paper.

The leading edge should be uneven and hottest in terms of color value. Followed by a more gritty or noisy texture.

Example effects- notice the bright, saturated color on the uneven edges of the effect.[12, 13]

This is followed by a particle effect that gives the illusion of crumbling to dust and blowing away. Below are examples of the look and feel of each effect.

Example effects- notice that the particles used sample colors from the object being dissolved.[14, 15]


# VFX

The effect used for showing the bee being poisoned needed to be a little different. Because it never leaves the screen, the corrode and disintegrate effect wouldn't work for the bee. Instead, a looping and inverted ink drop in water clip is used as a mask and colored to be the acidic neon green. This type of motion feels like liquid or smoke and adds another layer of movement, mimicking the swirling clouds in the background.

In this sequence, the hybrid state, the imagery is very tech. This sequence is about a hybridization of tech and nature. For the effects, sharp angles, straight lines and digital noise or interference are the goal.

Circuit boards and *Tron*[16] are good visual reference for the look and feel of these effects.

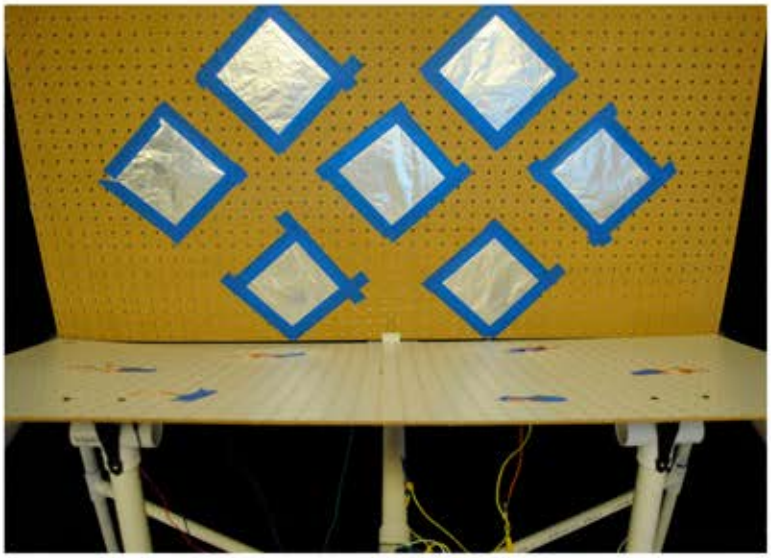
# VFX

This final set of effects returns us to our natural state and the beginning of the installation cycle. For these effects, a growing and shimmering flourish restores our natural elements in the scene.

The effects were created using three modified flourishes. Pine needles and pine cones were added to give them a branch or vine-like quality. These were then set as masks over a glimmering background. The flourishes are revealed following the direction of their curves. This gives them a sense of growing.

For a sense of the movement and glimmer, the winter fairies from a portion of the *Nutcracker Suite* segment in Disney's Fantasia[17] offer good reference. The patterns they make skating across the ice are very similar to the way the flourishes appear to grow and shimmer.

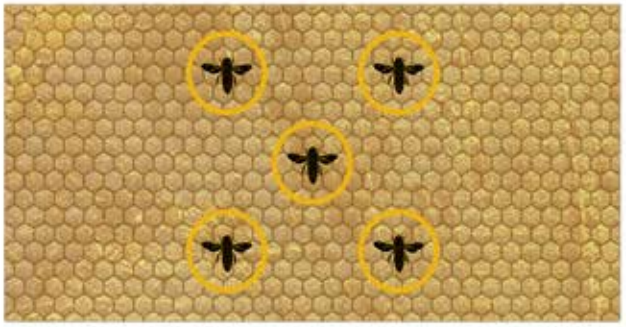
# Interface

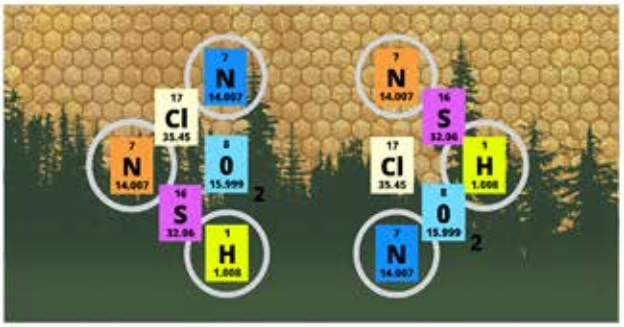


**The interface for this installation has specific dimensions of 2' x 4'. Because of the nature of the hardware, there are other specific design constraints. Our buttons use capacitive touch sensors made from patches of aluminium foil. These patches typically require a full palm press to activate properly. With this in mind, the indicators, layout and button scale of the interface were designed to accommodate this type of interaction.**

**The interface backgrounds mirror whatever state the user is at during the installation. These backgrounds change accordingly as users progress through the installation cycle.**

# Interface






**The button layout is mapped to capacitive touch sensor locations. Circles are the shape language we use to designate active touch sensors. When the circles disappear, those locations are no longer active as buttons. This circular design mirrors the radial elements in the larger projected animation and frame the different icons within each button.**

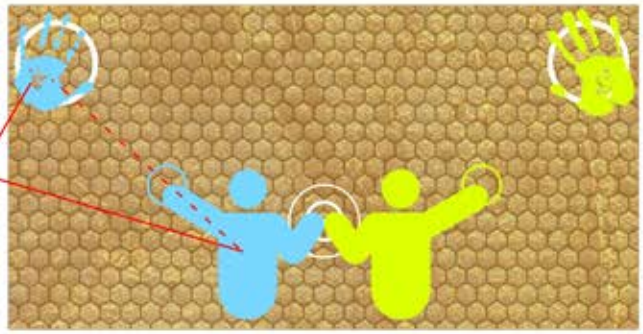
**The scale of the circles needs to be large enough to afford full palm press interactions. If the circle or button is too small, users are more likely to only touch with fingers. Finger presses are not always enough for the sensors to detect a full press.**

**Icon imagery in the buttons also needs to be adequately large and simple in shape. Complex shapes with fine lines or detail are lost in the projection resolution. In the top image, the bees are mostly black with some detail, but they make a strong silhouette and are instantly recognizable. In the blue interface layout, the images are detailed, but they are scaled larger than the buttons in order to maintain clarity. The periodic table icons are also scaled for ideal legibility and clarity.**

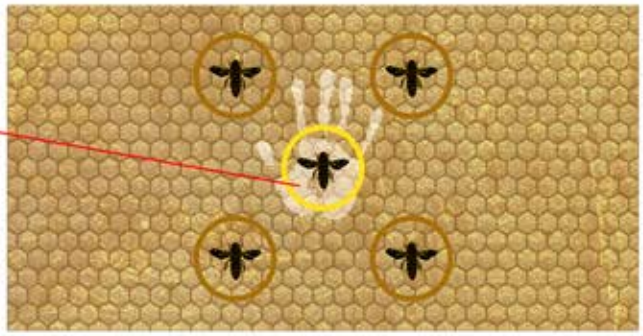
**Below are examples of earlier button icon explorations that simply didn't work. The detail was too fine, the shape too complex, and/or silhouette was not clear enough to be instantly readable.**

# Interface

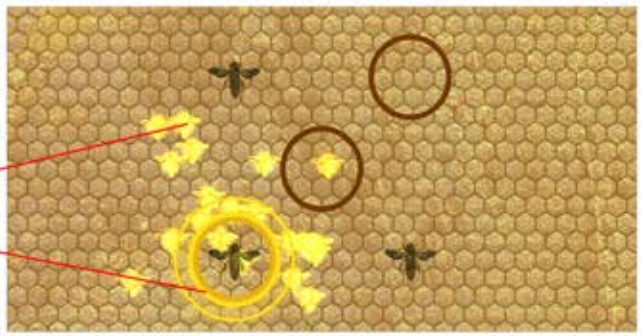
Hints and interaction indicators help users learn how the interface functions. The people symbols in two different colors encourage cooperative play. They indicate where users touch the interface, (at the respective colored hand print icons they point to) and then to touch each other or high five.



Hand prints are used as a hint in the first set of interactions. While the user is still learning how the interface works, a hand will flash over active buttons if no touch is detected for longer than ten seconds. The hand print also indicates the type of touch optimal for the sensors.



Particles, radiating rings, and dynamically changing colors are all ways in which the buttons give user feedback when they have been activated. The particles also travel up the interface and onto the larger projection. This is to help drive the users gaze up off the interface to see the animations and effects that the button press has on the larger projected image. In the sequence with the periodic table icons, this direction of gaze is intentionally eliminated allowing users to become completely engrossed or "distracted" by the interface.



# Interface

This particular interaction involves users matching the periodic table icons. These specific elements were selected because they comprise the chemical compound called neonicotinoids. These compounds are found in agricultural pesticides and are harmful to bees. The colors for each icon were selected at random and were sampled from other colors used in the installation imagery.

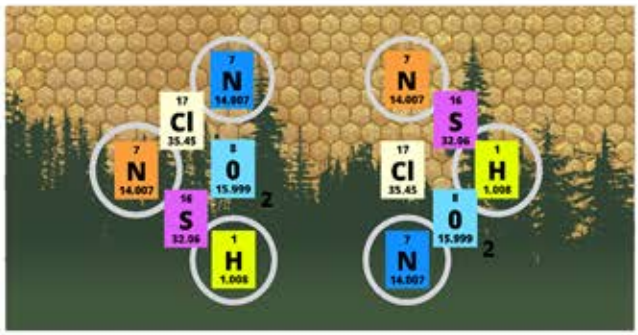
The layout is symmetrical. On both sides, a set of six icons rotate through the three button locations. Matches are made when users select two identical icons in corresponding or mirrored button locations.

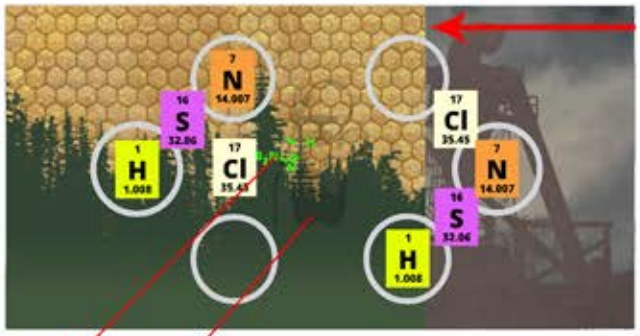
During this sequence, users are distracted by the matching game and pay little attention to the adverse impact they have on the larger projected image. Similarly, the interface background changes. There are three changing features, each used as player status indicators signifying how far along the users are in the matching game.

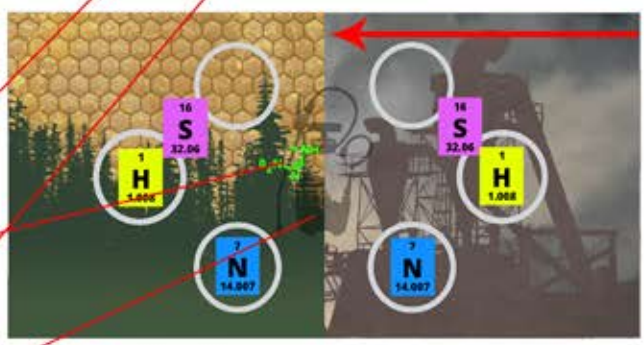
When users secure a match, the icons move to the center and disappear as part of a molecular compound is revealed.

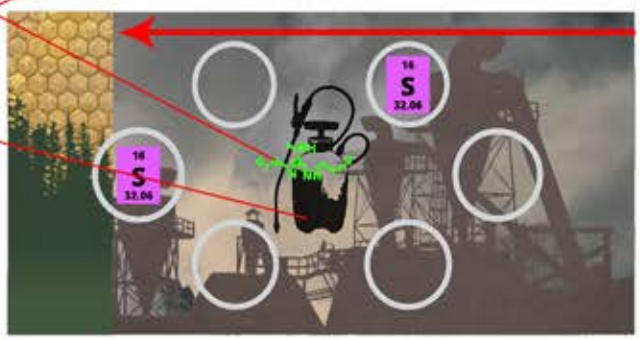
In addition to the molecule, a chemical spray can slowly comes into view becoming more and more opaque with every match.

Finally, the background gradually wipes to the left changing from the hive and trees to industrial structures and cloudy skies. (Shown with red arrows.)



# Interface

Once the matching game has been completed, the interface clears and the people indicators return. At this moment, users get a chance to look up and see the impact they have had on the larger image. Repeating the interaction of circuit detection through cooperative play reinforces this action of looking up. It also supports some of the messaging of the installation- having to work together to repair the damage.

To indicate a hint of more to come, a digital glitch bee flashes between the two people indicators. The digital glitch effect mimics glitchy televisions or monitors with static and RGB channel misalignment. Examples of the effect are provided below the interface image.[18, 19]


In this sequence, users work together to reconstruct the bee. The image of the bee has been split into six parts. For these parts to be readable, they had to be scaled larger than our button size. As discussed previously, details are lost in resolution if the scale is insufficient.

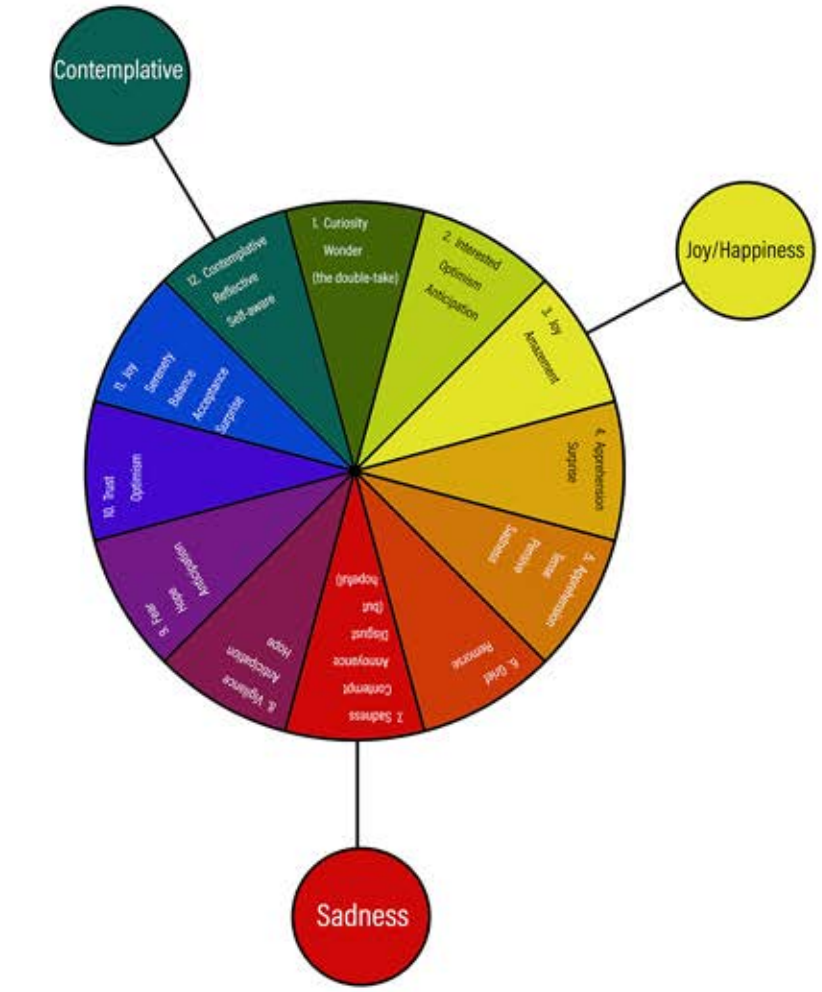
When users activate two mirrored buttons, the parts of the bee slide to the center and lock into place. Successful connection is marked by a change in color and a small burst of bee particles.

# Emotional Beats

| 1 | 2 | 3 | 4 |
|---|---|---|---|
| Curiosity<br>Wonder<br><br>Double Take | Interested<br>Optimism<br>Anticipation | Joy<br>Amazement | Apprehension<br>Surprise |
| Nature and tech/industrial imagery. | Movement, shifting parts. | Touch response induces change- visceral sound. | Natural elements effected by change. |
| **5** | **6** | **7** | **8** |
| Apprehension<br>Tense<br>Pensive<br>Sadness | Grief<br>Remorse | Sadness<br>Contempt<br>Annoyance<br>Disgust | Vigilance<br>Anxious<br>Hope |
| Natural elements fade-lessen-recede. | Natural elements "die off"/disappear. | Nature is gone, ruined, missing. | Possibility of natural elements re-emerging. |
| **9** | **10** | **11** | **12** |
| Fear<br>Hope<br>Anxious | Trust<br>Optimism | Joy<br>Serenity<br>Balance<br>Acceptance | Contemplative |
| Will change- revive nature. | Nature begins to return. | Natural elements have returned, but changed. | |

**The sequence of states in the installation were developed by creating an emotional beat board. This board is an early brainstorming collection of possible interactions, imagery and a large variety of emotional beats the user might experience as they go through the installation.**

# Emotional Beats




**From the emotions outlined in the beat board, an emotion wheel was created. It is correlated to the flow of the experience in a clockwise fashion. The emotional spectrum of the entire wheel is far too broad to hit each one effectively, but three main emotional targets were isolated from this wheel.**

# Emotional Beats

Neutral State

Contemplative

Joy/Happiness

Hybrid State

Nature State

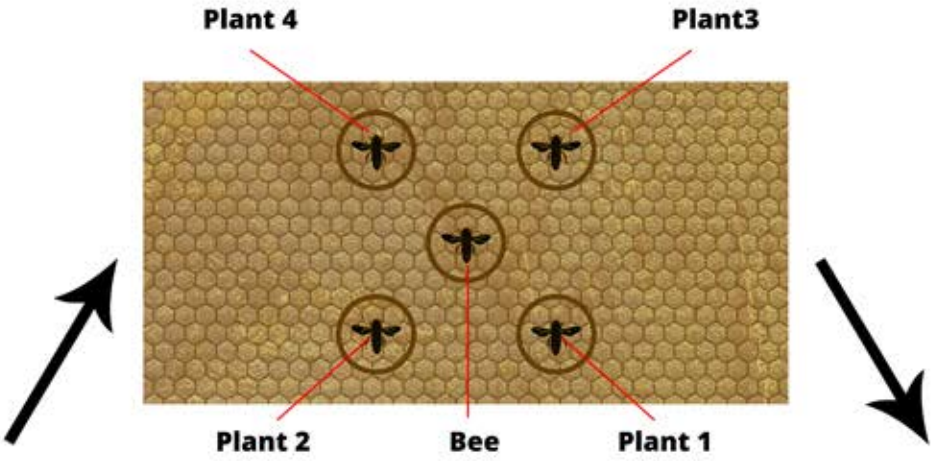
Industrial State

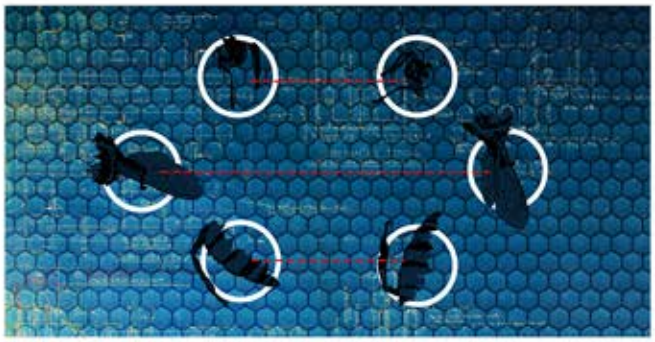
Sadness

These emotional beats are then applied to the flow and cycle of the installation. Users experience happiness moving from Neutral State to Nature State. Sadness happens when nature dies moving from Nature State to Industrial State. Moving from Industrial State to Hybrid State and then completing the full cycle leaves room for contemplation and reflection as users consider what they have experienced.

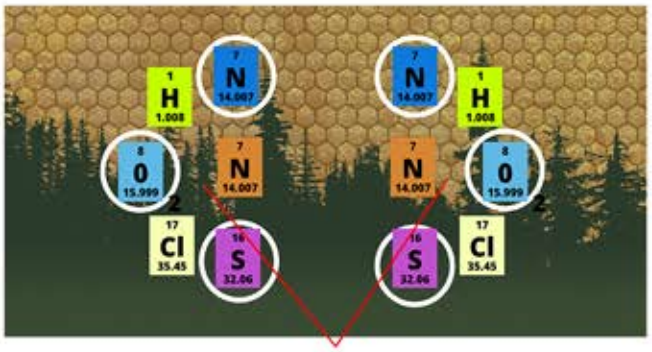
The cyclical design of the installation flow allows for passerby users to enter the experience at any point without interruption. The entire experience is a short loop, lasting typically between three and five minutes. The meaning of the experience can be slightly skewed depending on where a user enters or begins the cycle.

# Flow Charts



Reconstruction




Matching Game

Circuit Detection/Cooperative Interaction

# Flow Charts

Neutral State

Nature State

Industrial State

Hybrid State

# Storyboarding

**The following is a storyboard of interactions used a s a road map for completing animations and fx creation. Many of the art assets included were place holder at the time this storyboard was created. In addition, many of the interactions were still under construction in terms of both design and hardware.**

**1. Initial interface will flash a hand print to indicate to users how to interact. Meanwhile, the primary image displays looping background hex expansion. This is the beginning Neutral State.**

**2. Small spinning hexes begin to appear creating a layer of ambient movement.**

**3. First button pressed, a flower is magically revealed! Spiraling particle streamers and lens flare effect fly upward through the image.**

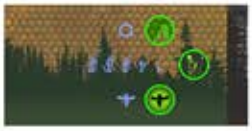
**4. Pressing a second button reveals another flower on the other side.**

**5. Pressing a third button reveals a thistle. This time the particle and streamer effect are slightly altered and have different type of motion.**

**6. Pressing a fourth button reveals a companion thistle on the other side.**

# Storyboarding

7. Pressing the fifth button generates a golden blast of bees radiating from the central bee image. This is the last effect of the set and marks the complete construction of the Nature State. The interaction is programmed so that regardless of which button you press, the fifth and last one generates the bee burst. The blue octagon moon cycle image behind the bee begins to turn and the bee pulses.



8. At this point in the installation, the interface dynamically changes. New buttons replace the bee buttons, status symbols appear in the center, and the background changes to a responsive wiping mask revealing an industrial scene beneath. From here on, much of the art is placeholder until full animations can be completed. That said, functionality of the interactions is programmed and complete using placeholder art.

9. The new interface presents a "tug-of-war" sequence. The idea would be that here, two users could go back and forth pressing buttons on either side of the interface. Pressing green buttons on the right reveals the second user's buttons on the left. Buttons on the right produce a toxic effect, and buttons on the left produce a restorative effect. The interaction is weighted so that toxic effects easily win out. This weighting is intended to help drive the installation cycle forward.

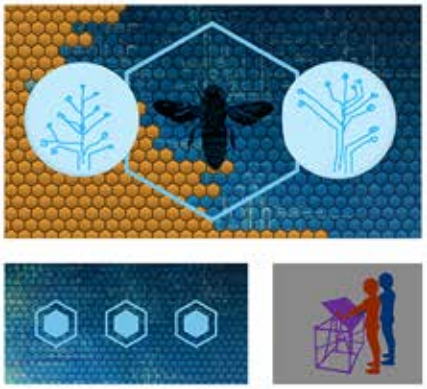
10. Progressing with weighted toxic effects, elements of the Nature State fade and reveal the Industrial State. Each toxic button has 5 levels of weight. Once each toxic green button is reached max, the buttons disappear and the effect is locked. The status symbols between the buttons indicate to users which level they are at. The opposing blue buttons reverse the toxic effects, but at a slower rate.

11. When the 5th level is reached, the corresponding element in the primary image changes or fade away. When all buttons are locked, the bee has been poisoned and the full Industrial State has been reached. Toxic particles float in the background, the bee has collapsed, and the chemical compound for neonicotinoids (chemical linked to bee die off) glows in the center of the image.

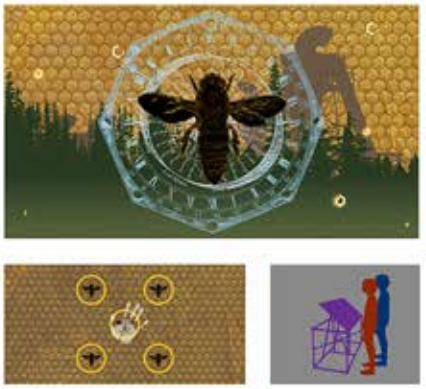
12. Once at full Industrial State, the interface will indicate a new interaction. This sequence introduces the Makey Makey® technology where interface input is received when a circuit is closed. Users will be instructed to touch indicated regions on the interface with one hand and then to make physical contact with each other with the other hand. When connected, a bright blast will radiate from the center of the primary image.

# Storyboarding

13. The Makey Makey® interaction brings us to the Hybrid State. The interface presents new buttons that act to restore nature elements. The imagery is intended to have a technological feel with circuit board patterns and glowing blue light.

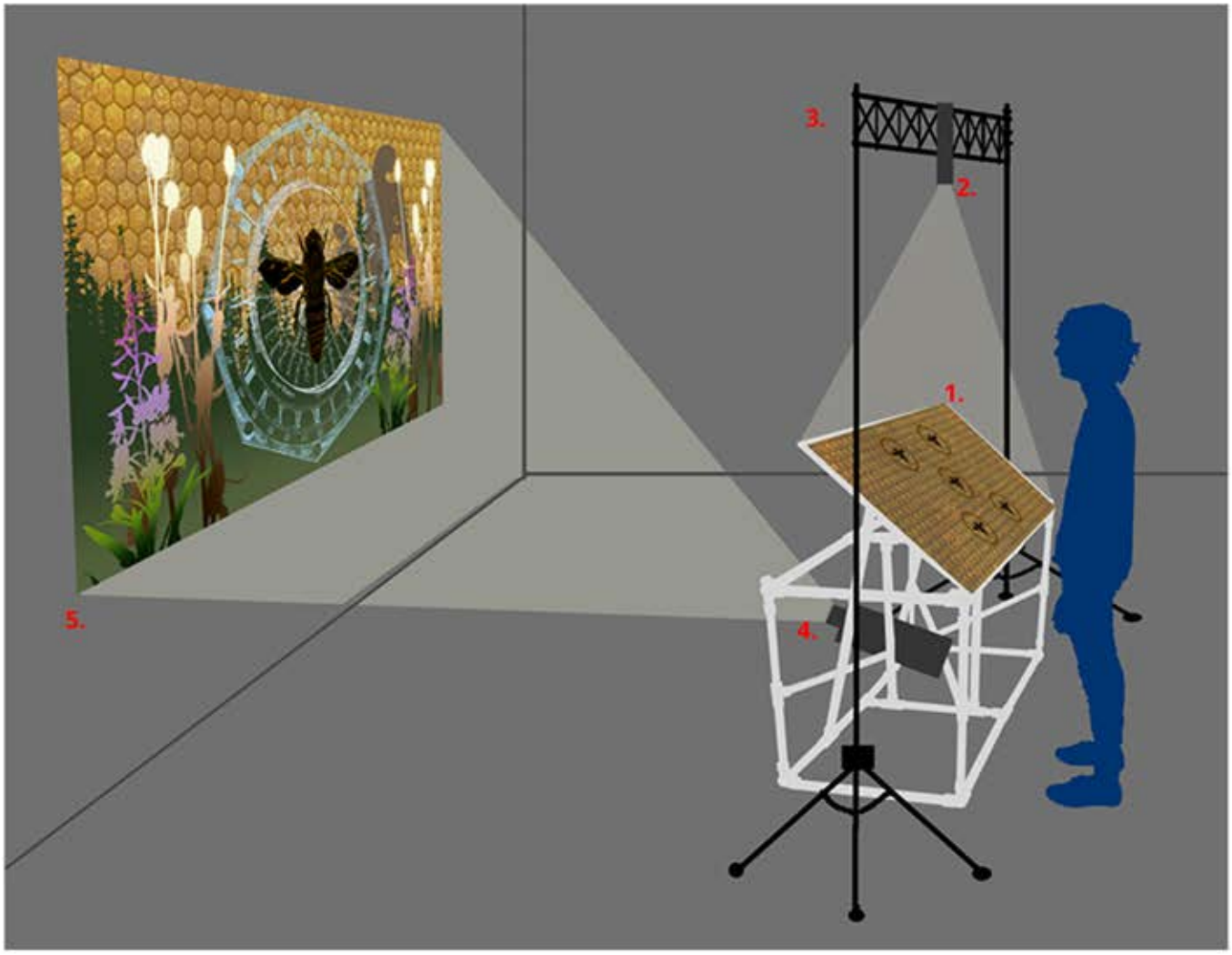


14. Each button restores a different element of the imagery. For example, the first one restores the bee, the second restores the hex pattern, and the third restores the trees and moon cycle. This will gradually return us to the initial Neutral state.



15. Once all Hybrid state buttons have been pressed, the Neutral State is restored and the installation cycle can start again.

# Setup Diagram




1. Custom built interface

2. Pico projector- top down projection of interface information. (AAXA Technologies P300)

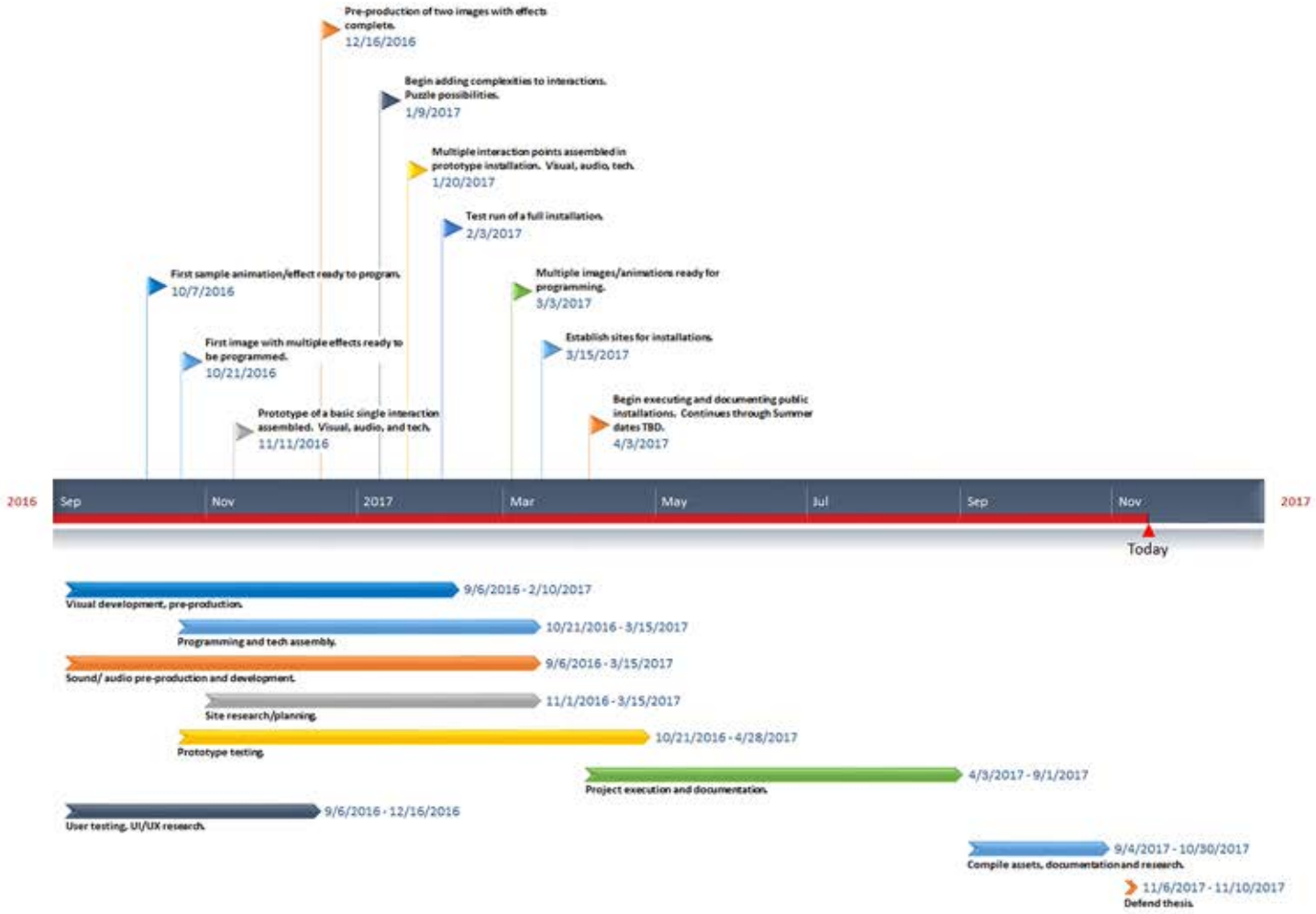
3. Lighting truss

4. Large image projector (NEC NP510W

5. Large projected image- screen or wall.

# Production Schedules

## Fall 2016

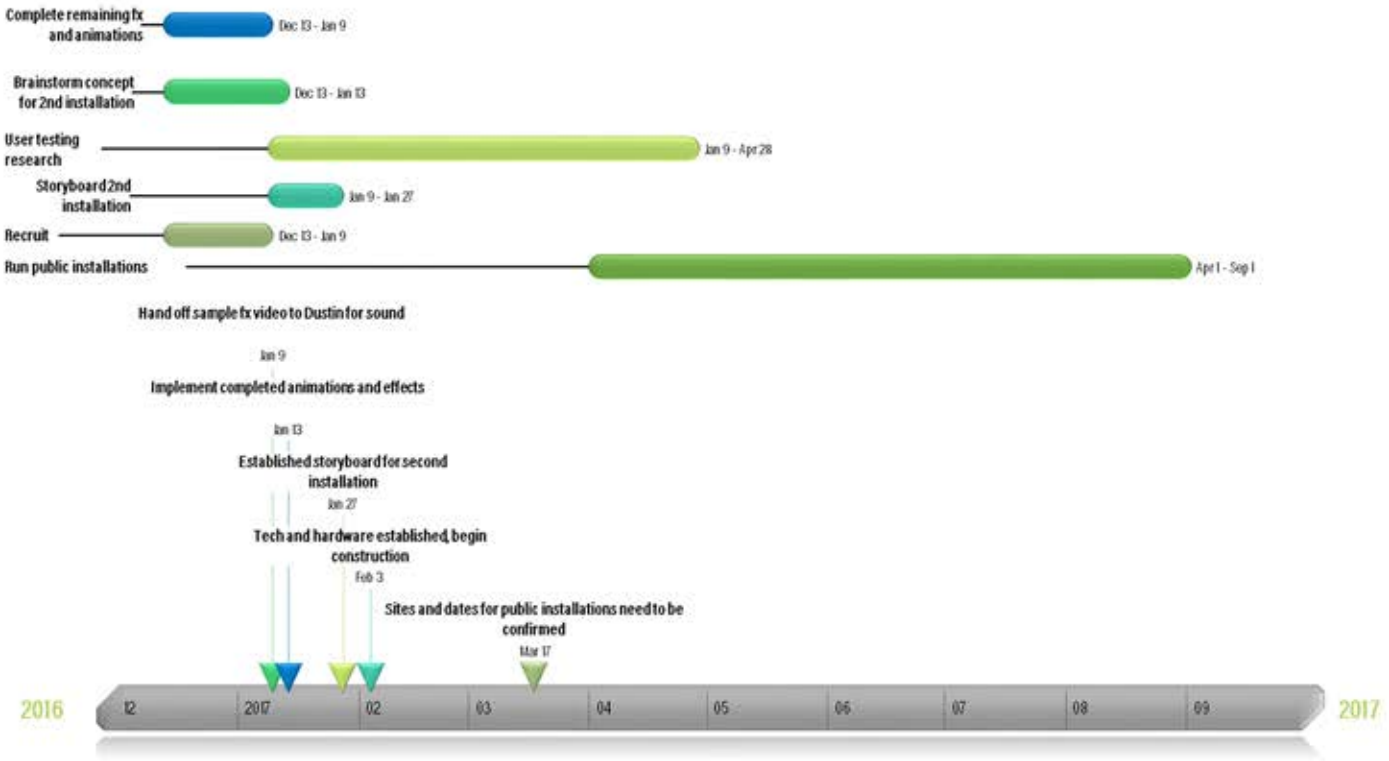



| Moving Forward | | | | | | | |
|---|---|---|---|---|---|---|---|
| Week | S | M | T | W | TH | F | S |
| 9 | -In Unity<br>-Slideshow<br>-Ambient and Transition SFX (natural, industrial, transitions) | | | | Presentation<br>Show interface + Two segments | 20 single key frames to all animations Alex | |
| 10 | Alex-Animation block 1 to Dustin<br>Implement interactive functionality Jason | | | | | 20 2nd key frames Alex | |
| 11 | Dustin-Audio block 1 to Alex α-Animation block 2 to Dustin<br>Work on fulfilling TCR/DCRs Jason<br>Finalize interface board construction | | | | | | |
| 12 | Dustin- Audio block 2 to Alex<br>Audio done Dustin<br>All assets final to Jason | | | | **Thanksgiving**<br>Implementing art assets Jason | | |
| 13 | | | | | Begin constructing installer Jason | | |
| 14 | | **Project DUE** | | | | | |
| | | | | | | | |

# Production Schedules

**Spring 2017**

## Schedule




| | Week 6 | Week 7 | Week 8 (Spring Break) | Week 9 |
|---|---|---|---|---|
| **Alex Bennett** | Work with Jason on tweaking Bee, make assets for Frame project. | Work on assets for Frame project. | Try to finish up animations for Bee implementation. | Work on Frame assets, polishing Bee. |
| **Isaac Dayton** | Construct prototype wall for better testing. | First interaction chain (with capacitive input). | Finish/polish first interaction chain, begin second. | Finish a rough version of second interaction chain. |
| **Jason Eldred** | Continue implementation, tweaking, and bug fixing. | Playtesting and tweaking. | Implementing new assets upon arrival. | Help with construction on Frame project. |
| **Dustin Williams** | Polish Bee audio mix/plan Frames audio | Continue to polish Bee audio, mix/compose additional. | Implement Frames audio assets. | Polish Frames audio mix. |

# Production Schedules

## Spring 2017 Continued

| | Week 10 | Week 11 | Week 12 | Week 13 | Week 14 |
|---|---|---|---|---|---|
| Alex Bennett | Hard push to complete Bee animations and final assets. | Complete Bee animations and final assets. | Create Frame assets, tweaks with Jason on Bee. | Frame assets and tweaks with Jason. | Frame assets and polish for submission. |
| Isaac Dayton | Implement and test Frames hardware, playtest and polish "Music" Frame. | Implement and test second Frame concept. | Playtest and polish second Frame, prototype third Frame. | Playtest and polish third Frame, review and tackle outstanding CRs. | Handle submission tasks and documentation, final tweaks to Frames. |
| Jason Eldred | Setup data collection and testing on Bee. | Begin work on Frames, continue testing Bee. | Asset implementation and construction on Frames. | Final tweaks to Bee, final tweaks on Frames. | Polish for submission. |
| Dustin Williams | Polish Bee audio and plan Frames audio. | Polish Bee audio and compose Frames audio. | Compose and tweak Frames audio. | Tweak and finalize Frames audio assets. | Polish for submission. |

## Fall 2017

# Roles

**Alex L. Bennett MFA** — Art Directior, Team Lead, Visual Asset Production

**Jason Eldred BAGD** — Producer, Interaction Designer, Hardware

**Dustin Williams BAMSD** — Sound Designer (Volunteer), Soldering

**Isaac Dayton RTIS** — Designer, Programmer

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14. After Effects Series Tutorials, "After Effects Tutorial: Disintegration Effect," *YouTube*, published January 6, 2016, accessed December 27, 2017.

15. Maxwell Ridgeway, "After Effects Tutorial: Disintegration effect: 2 minute Tut," *YouTube*, published July 13, 2017, accessed December 27, 2017. https://www.youtube.com/watch?v=D1PdjGLbK5E.

16. *Tron: Legacy*, directed by Joseph Kosinski, (2010; Burbank, CA: Walt Disney Studios Motion Pictures). Intro still.

17. *Fantasia*, directed by Samuel Armstrong, (1940; Burbank, CA: Walt Disney Productions). Still from "Nutcracker Suite."

18. "Digital Glitch Text Effect," *GraphicsFuel*, published February 26, 2016, accessed December 27, 2017. https://www.graphicsfuel.com/2016/02/digital-glitch-text-effect/.

19. Felix Turner, "Glitch Your Images with ImageGlitcher," *Airtight Interactive*, published February 4, 2011, accessed December 27, 2017. https://www.airtightinteractive.com/2011/02/glitch-your-images-with-imageglitcher/.

# Thank you!