

Welcome to Projection Mapping.

Our Simple Definition is using a projector to throw animation & video onto a 3D structure to give a unique illusion of reality.

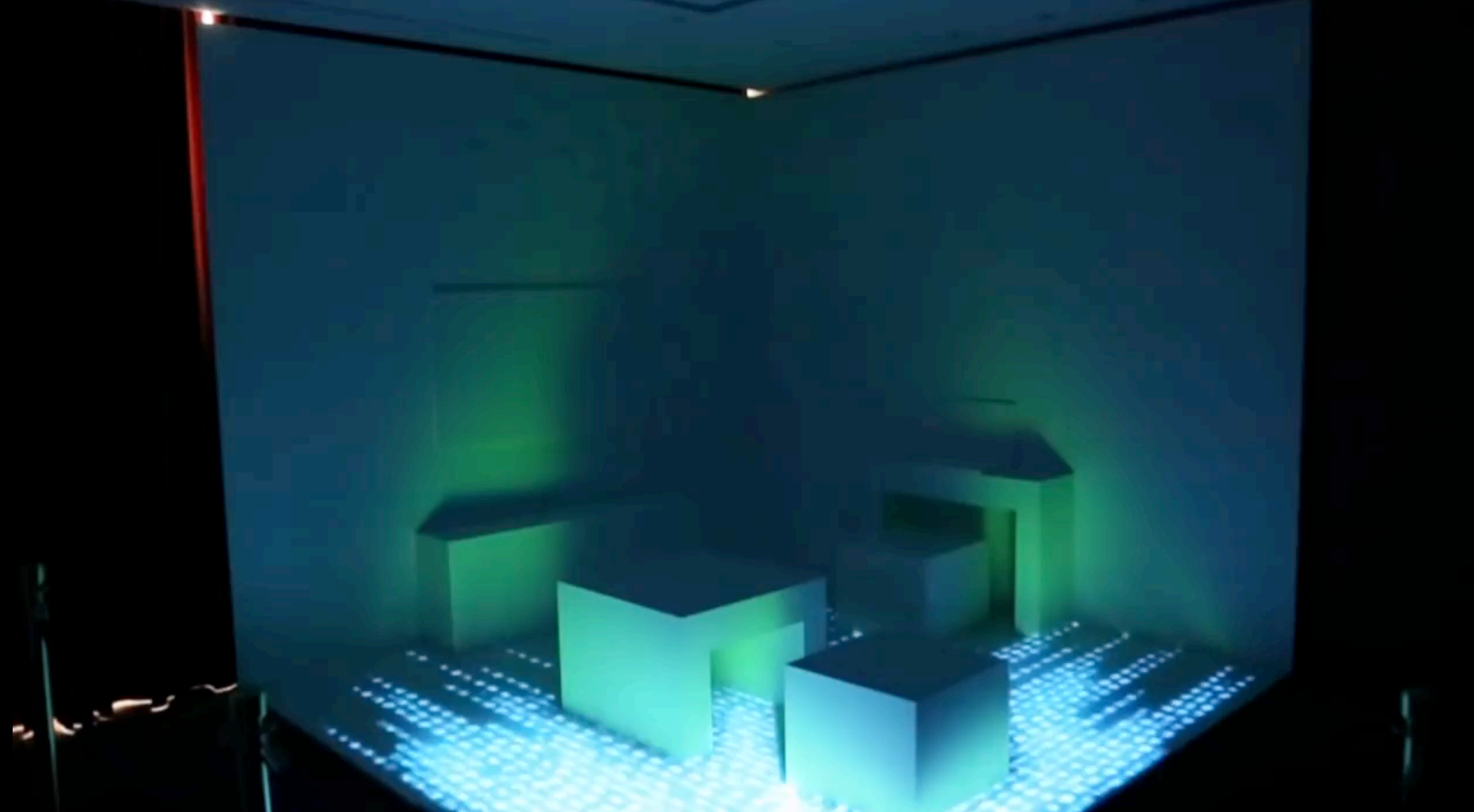
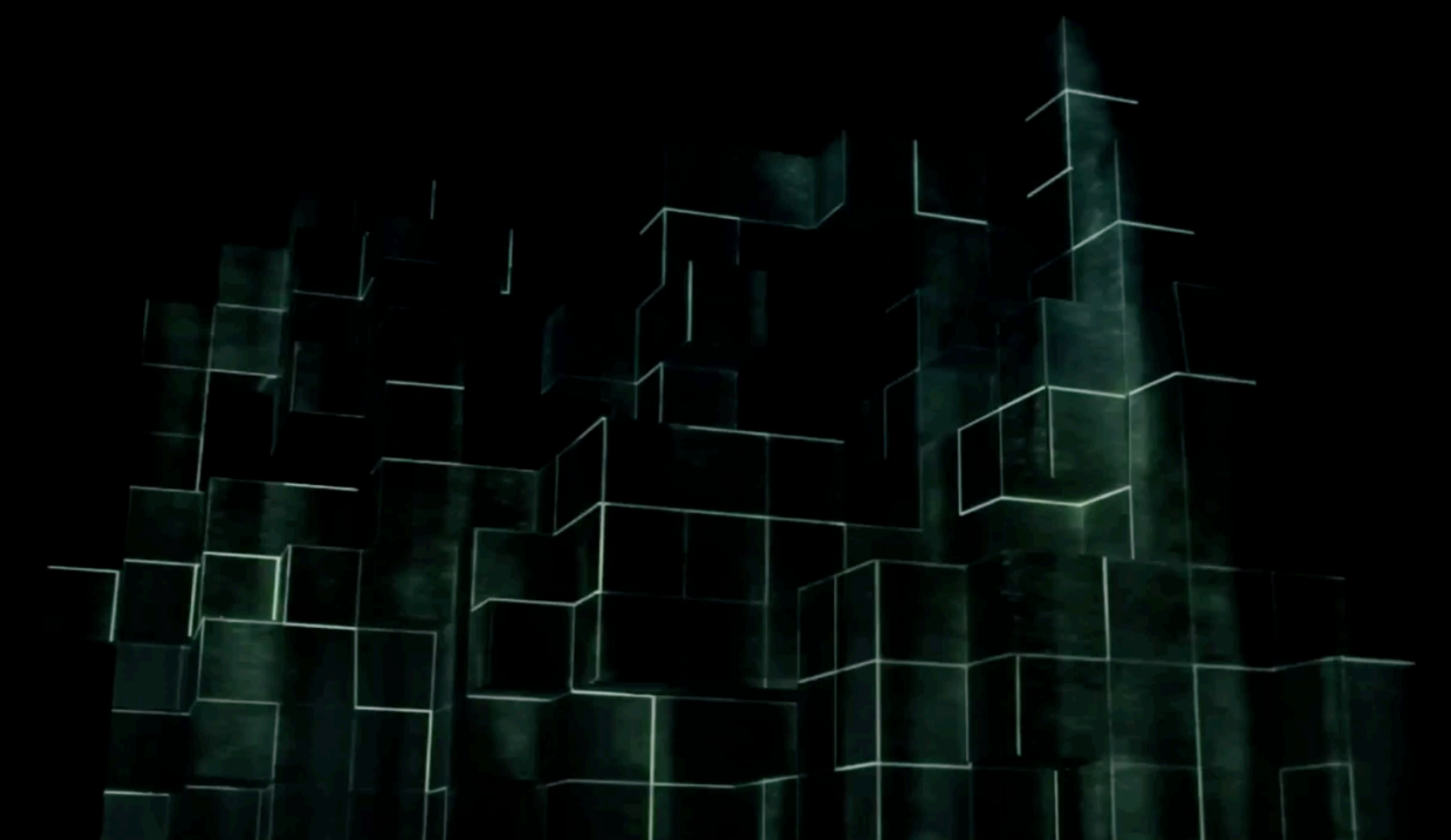
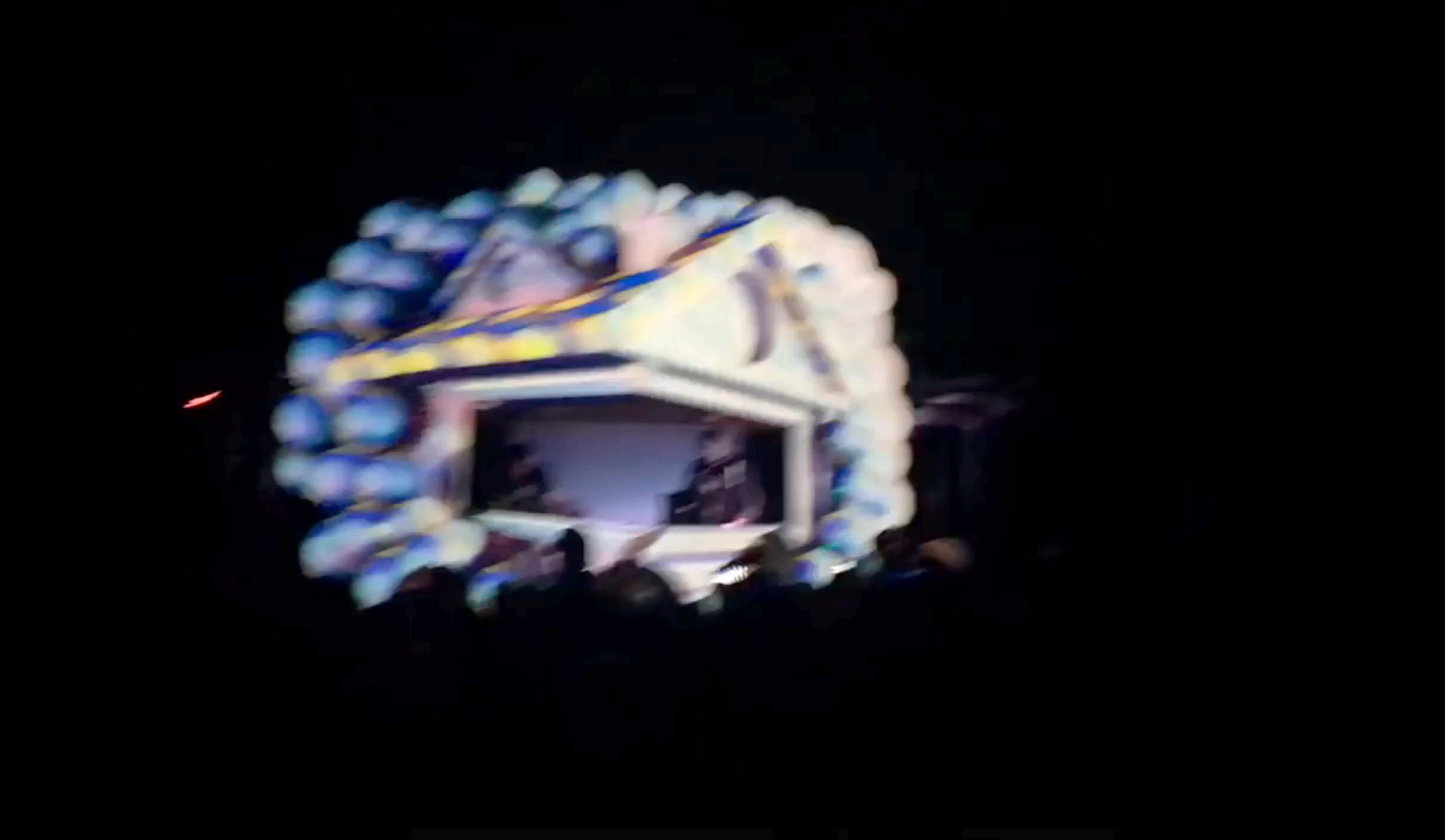
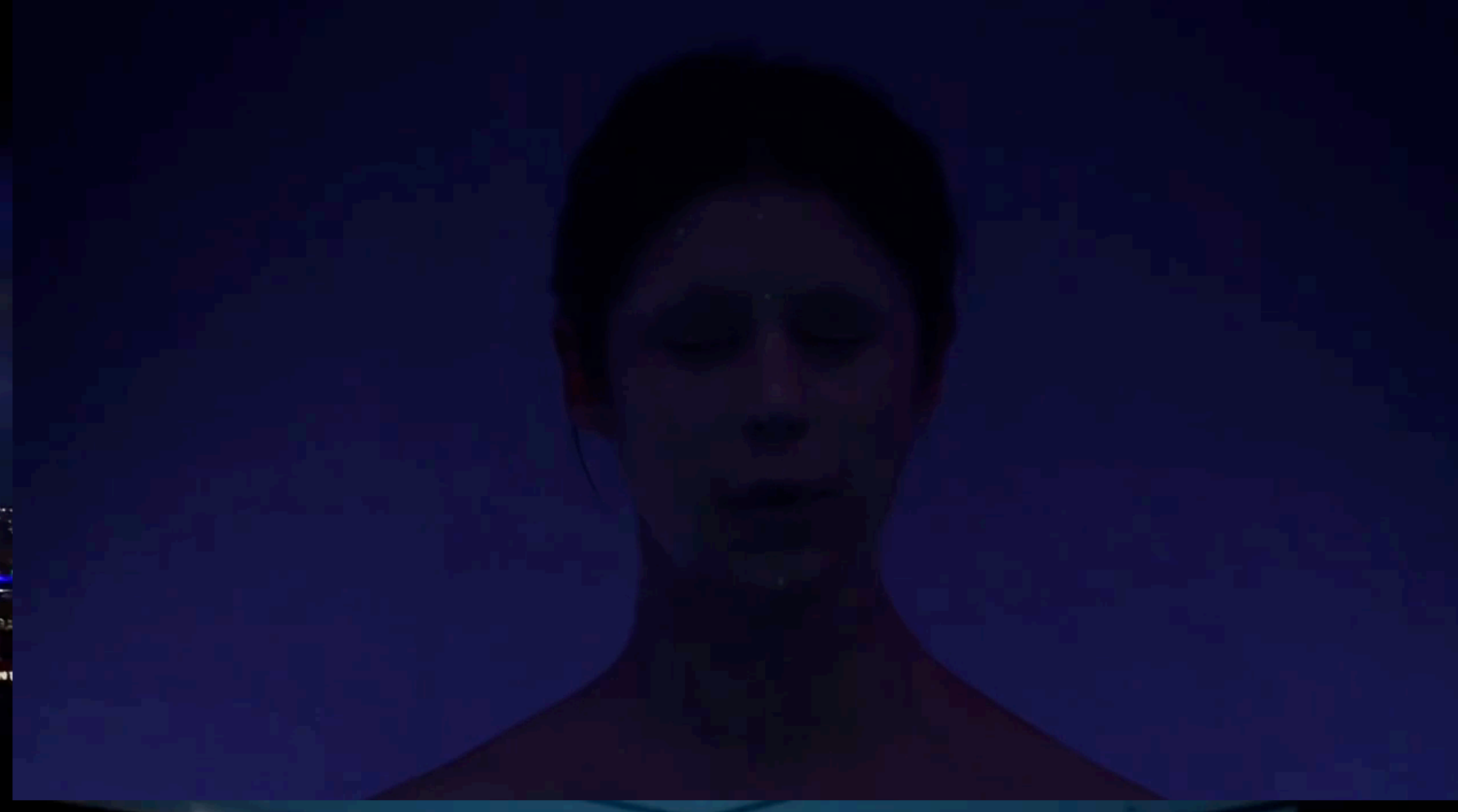
Pretty much a mind f***



What Helps Create the Illusion?

What helps most with creating this illusion is a understanding of XYZ Space.
Here is a open-ended list of ways you can this illusion.

- 1. *Depth*** (*object in space*)
- 2. *Lighting***
- 3. *Positive & Negative Space***
- 4. *Breaking Form***
- 5. *Perspective*** (*leading lines*)





What Do You Need?

Necessities

- **Projector**
- **After Effects CC**
- **Arena Resolume**
- **Structure**

Optional

- Motion Plugins
- Podium / Rigs
- Cinema 4d (3D Heavy)



Projectors

The Features

DLP - DLP creates the most black color projecting. This means it shows better contrast and value in your projection. Essential is helps with the illusion more.

Resolution (1920x1080) - A projector throws out pixels just like a screen. The more pixels, the better the quality of the projection.

Lumens - This is the power of light that can be projected out from your projector. This helps with saturation and lighting from farther distances.



After Effects CC

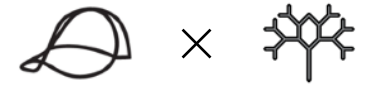
Things to learn.

After Effect CC - This is the suggested version from us. The effects and presets in CC are more powerful than CS6. Overall, it's pretty much a necessity.

Easy Ease // Graph Editor - Please learn this. This is what makes motion in these programs look realistic. (ex. Gravity)

Alpha // Luma Mattes - This is very important for masking out layers.

Jesus... Just watch the Lynda Courses on After Effects



The Steps

- 1. Develop Your Story***
- 2. Understand Your Structure***
- 3. Set Up***
- 4. Animation***



Develop Your Story

Music - Music or Sound is what carries your animation through and helps tell your story. Even if its just something interface heavy, you still need sound.

Moodboards - Find inspiration. Put it on boards. Start drawing connections.

Storyboards - Figure out the story. Pace it out. It doesn't have to be pretty. Just get the idea of pacing through your entire project. Make sure to time to your music if needed.

DO NOT GO TOO LONG.



Understand Your Structure

DOs

- **Keep the Structure Simple.** *(or don't)*
- **WHITE // LIGHT // SMALL**

DON'Ts

- **Don't protrude out to much. Too Sharp of angles make it hard to project.**
- **Don't make it super complex to where it is impossible to map onto.**
- **Avoid curved surfaces if possible.**



Understand Your Structure

Building Materials

- Poster Board
- Hot Glue
- Spray Paint
- Mesh
- Tape
- X-acto Blades
- Measuring Tools! (Triangle, Rulers, etc.)

**This is where you can experiment a lot for materials to project on.
Just be careful and test before you go all out.**



Set Up

- 1.** Find a space! Somewhere permanent is the best. (You don't want have to keep remapping each time you set up.) You don't need a lot of space either. Just make sure its not a busy area, and if it is tape it down very securely.
- 2.** Mount your structure! Tape it. Then tape it again. Then glue it. Then yell at it not to move. Then tape one more time.
- 3.** Shoot your projector onto your object. Make sure you cover the entire area you plan to project on. (Podiums help.) (Also mess with angles depending on structure. Usually you want your projector straight across from your object but a little angled down because of your projectors throw)



Set Up

4. Tape... EVERYTHING. Being secure is the goal. Nothing moves. Nothing leaves the octagon. But **don't cover fans** on your projector, that thing is going to get hot. Also measure out the distances from projector to structure when you finish. Save that for later.

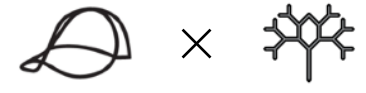
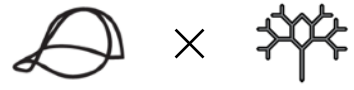


Photo Masks × Resolume Masks



Photo Masks

- 1.** After setting up your projector, place a camera right on top of the projector and point it at your structure. You want to emulate what the projector sees out of the lens.
- 2.** Snap a photo of the structure and bring that into Illustrator Or After Effects.
- 3.** Mask out your structure. Create planes out of the structure (your structure should be made out of these planes already). It helps separate what you want to animate.
- 4.** Test out how you did by bringing in your masks into Resolume.
- 5.** Use these Masks to start Animating in After Effects. Make sure to constantly test in resolume while you animate.



Resolume Masks

- 1.** Open Resolume Arena Software. Go to the Composition tab and click on settings. The dimensions of your composition should match the output dimensions of your projector. You can usually find these settings in your projectors manual, or by searching the projector model on google.
- 2.** Once the settings of your composition match the output dimensions of your projector, you now want to display what you are projecting out of Resolume through your projector as if it was a second monitor display. (If you haven't already open your preferences on a mac and turn off mirror displays.)
- 3.** Now we want to put a solid color into a layer within Resolume so that we can display it through our projector. Go into sources on the right side of the Resolume interface and click and drag a solid color on to layer 1.



- 4.** With mirrored displays turned off you now need to open the Output tab within Resolume and choose display 2. This basically takes what footage you have in a layer in Resolume and displays it through your projector.
- 5.** With our solid color displaying through our projector (second output) we are now ready to begin mapping our structure. Click the output tab within Resolume and now click the advanced option. A new window will pop up which will allow you to map your structure.
- 6.** Since we want to output our image through our projector and on to our structure we will choose the output transformation tab. On the right hand side where it says device we will choose display 2 because this is your projector display. Now the solid we put in our layer should be displaying through our projector.



7. On the left hand side you will see the option between Screens and Slices. A screen is the top layer within the hierarchy and holds the whole footage or image we are projecting through a layer. While a slice is a sublayer of the screen that we can manipulate to map our structure. Depending on the number of sides and surfaces of your structure will determine how many slices you will need to create. Each slice will map one side or surface of you structure.

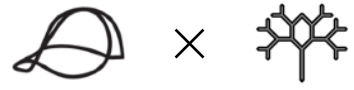
8. To begin mapping click slice 1. You will notice anchor points have surrounded the display. We can transform and distort these anchor points to match the surfaces and sides of our structure and correctly projection map our structure. Click and drag these anchor points to match the first side of your structure that you want to map. The transform tab moves and scales the slice as a whole, while the edit points tab allows you to move each anchor point individually. Once you are done mapping the first side label it so you remember which slice corresponds to which part of your structure.



9. Add another slice to your screen by clicking the plus sign. You will notice you have the option to choose polygons and masks. These other forms of slices can be used if you have odd shaped surfaces you need to map that have more or less sides than the standard slice provides

10. Continue this process of adding slices and mapping your structure until all of your surfaces are mapped out in to individual slices. Change the color of the projected slices with the hue sliders. This will help you distinguish between each slice once we bring this in to after effects. Remember to always label your slices!

11. Once you are done mapping your structure click the presets tab and save your mapping to your desired folder. You can save at any time during the process of mapping so save often! If you don't save within the advanced options your mapping will not save.



12. Now we are ready to bring our mapped structure in to after effects. Zoom out of your output transformation so that you see the full size of your screen. You will see your mapped slices floating within this black window. Think of the black area as the dimension your projector outputs. The location of your slices on your screen are where your structure is actually sitting within the light of your projector. Now carefully screen shot the exact edges of your screen window.

13. Open After Effects and import to the screen shot you just took of your mapped screen. Make a new composition with the same dimensions you have been using in Resolume. Place your screen shot in that composition and scale it to fit the dimensions. Since the dimensions of our screen shot match the dimensions of our Resolume output, you should be able to scale your screenshot to fit the After Effects composition perfectly.



14. With a scaled to fit mapping of our structure in After Effects we can now begin creating the animation work for our project. Remember that each color slice represents a side of your structure. You want your animations to fit within these boundaries so that they correctly map across your structure when you play your final animations. The best way to do this is by creating new layers or masks that trace the exact dimensions of your slices. At this point this all depends on what YOU are trying to achieve with your projection mapping project.

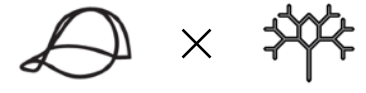
15. When you are ready to test out your animation on your structure add your composition to your After Effects render queue. Make sure your Render Settings dimensions still match those of your projector. Go in to your output module and choose quicktime as the codec. **MOST IMPORTANTLY** go in to your format option and choose DXV or DXV 3. If you do not have these codecs you can install them for free from the Resolume website: <https://resolume.com/software/codec> This codec is what Resolume runs best with so you always want to render your animations in DXV if you are putting them through Resolume.



16. Once your video is rendered out open up your saved file of Resolume and place the rendered video in to the layer column. Click the video so it plays and then make sure output tab is set to display two so the footage goes out of your projector.

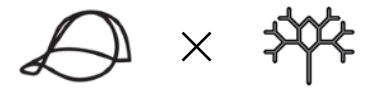
17. More times than not your animation will not be perfectly mapped to your structure. **DO NOT BE ALARMED.** If your projector accidentally moved overnight this can cause the mapping to slightly be off. You can always go back in to your advanced options where you mapped your structure and edit the edges of your animation just like you would with slices. To do this add a new slice and make its input whatever layer your animation is on. Click edit points and add subdivisions across your screen. Each one of these subdivision points you can click and drag to manipulate and stretch your footage to the desired location.

NOTE: Doing this will warp your footage so its always best to physically adjust your projector to try and realign your animation to your structure.



Animation

Based on your moodboards & storyboards, start animating your structure. Make sure to always go back and forth between Resolume and After Effects to make sure your animation is projecting right on your structure.



Q&A

Got questions... well that's why Google and Youtube were made.