

# Introduction to Projection Mapping

# Projection Mapping

Generally refers to projection onto a 3d surface and warp the 2d image to match that surface. This may be a building, car, sofa, box, globe, tree etc...

Allows us to break away from rectangular confines of the projection screen to alter and augment spaces or objects.

Mapping may not always be needed - sometimes we just need to mask or align a projector.

Projections onto objects and in public space has a long history and only recently has become widely identified as “projection mapping”

# History of Projection: Video and slide projections

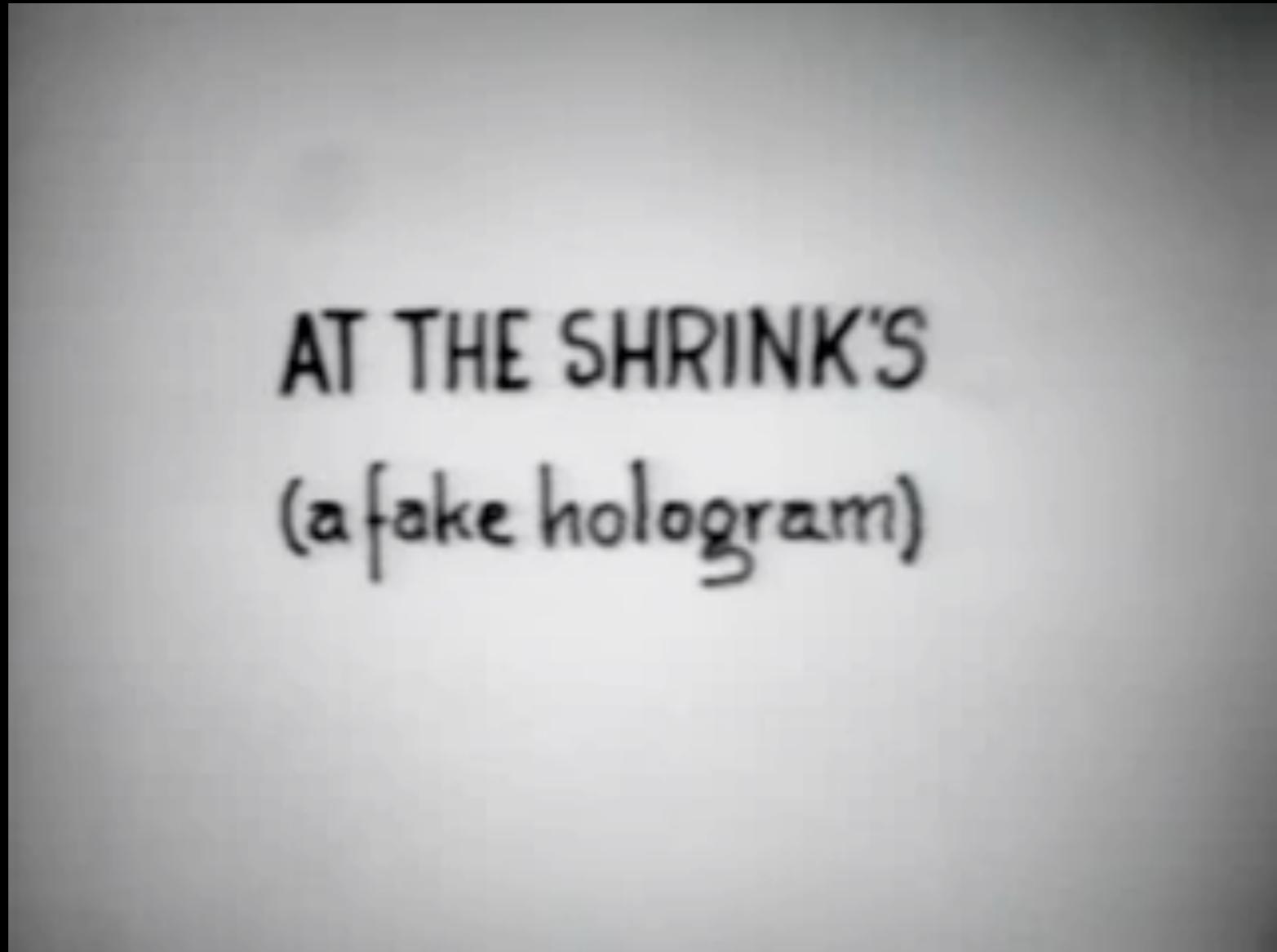
# Disneyland Ghosts (1969)



# Displacements by Michael Naimark (1980)



At the Shrink's by Laurie Anderson (1977)



Krzysztof Wodiczko  
Working with projections  
since 1980s



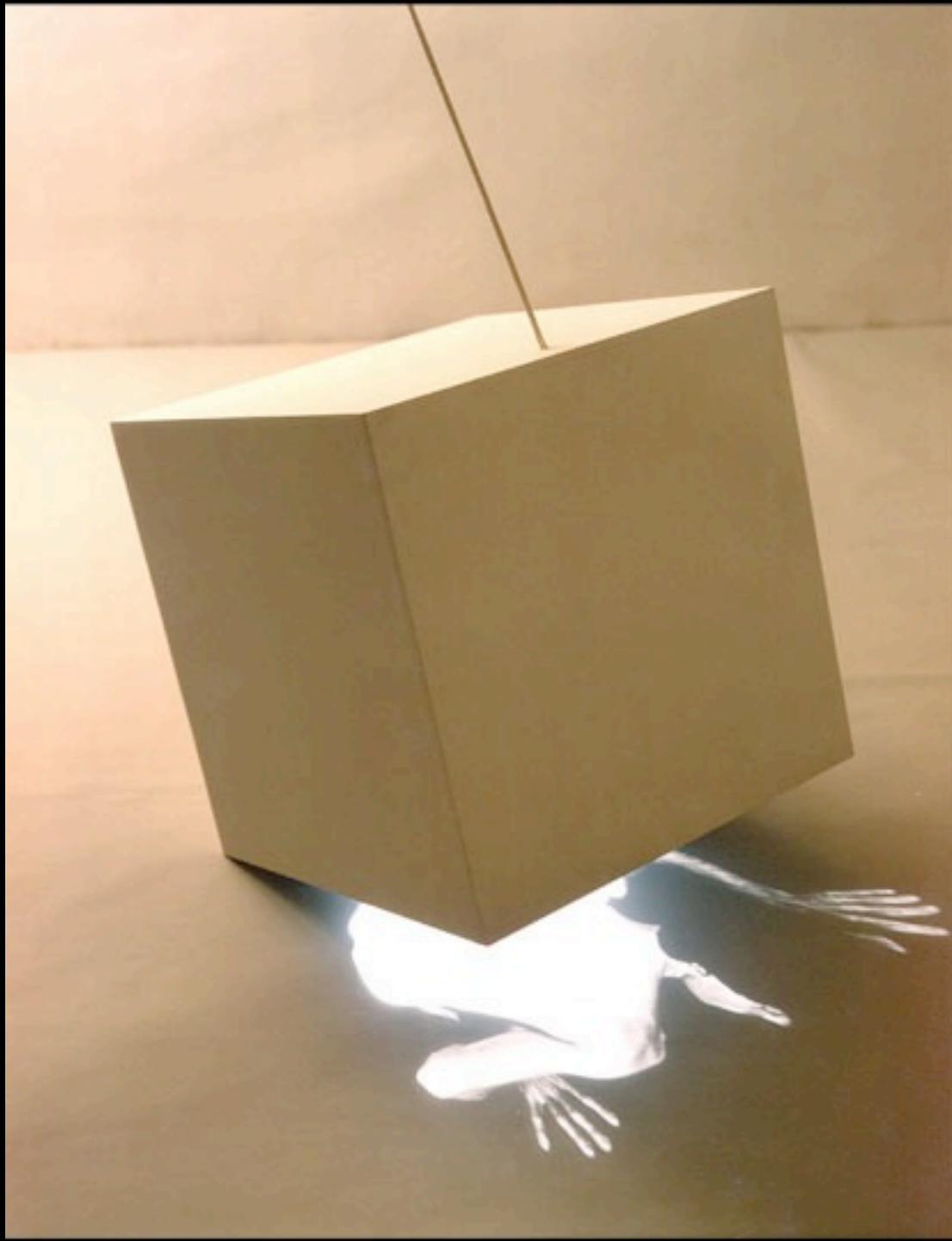
Tony Oursler  
Working with projections  
since early 1990s

Crying Doll (1993)



Daniel Canogar

Working with projections since the early 1990s



Contra Balanza



Body Press

Artists using digital projection  
to change a space or object

Pablo Valbuena, Time Tilings



Davy and Kristin McGuire, Ice Book



a dandypunk, Alchemy of Light



Excerpts from a living manuscript

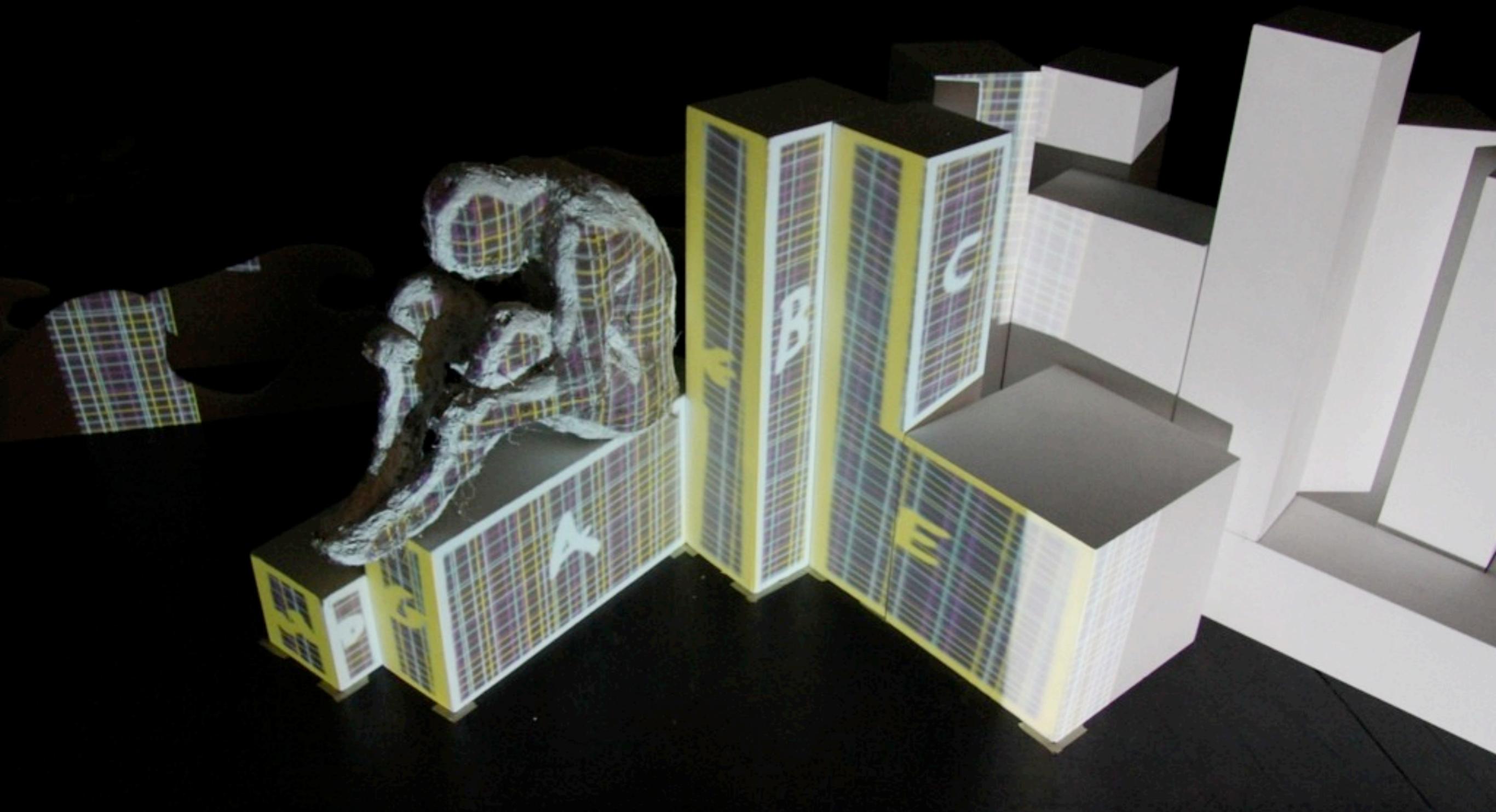
Karolina Sobecka, Wildlife



# Projection Mapping Techniques

## Projection on 2d planes with warping

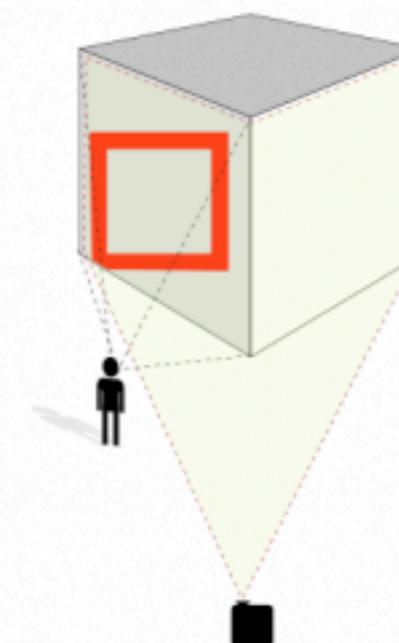
By warping a projected image, 2d images can be aligned to flat planes in 3d space. The warping corrects the distortion that occurs when projection at an angle to a surface.



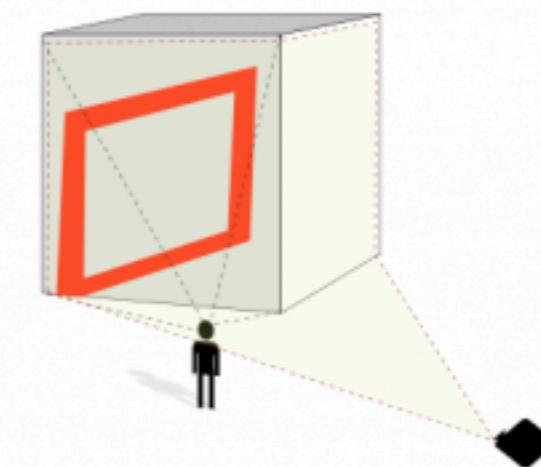
Projected image



Camera point of view



Observer point of view

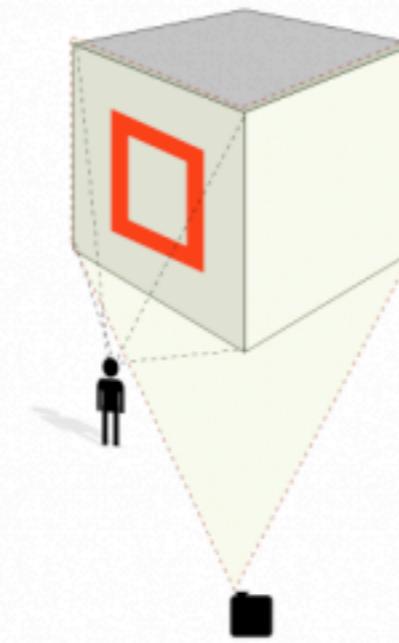


**b**

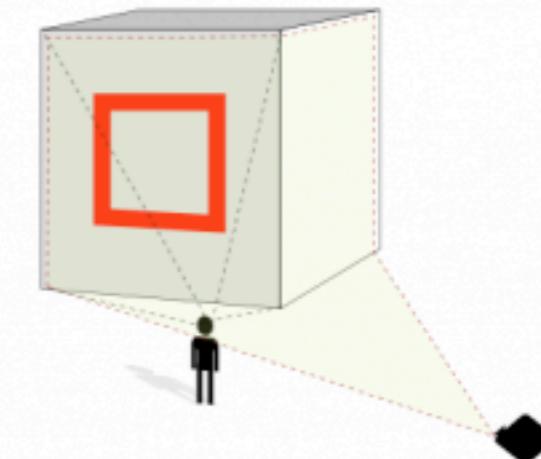
Projected image



Camera point of view



Observer point of view

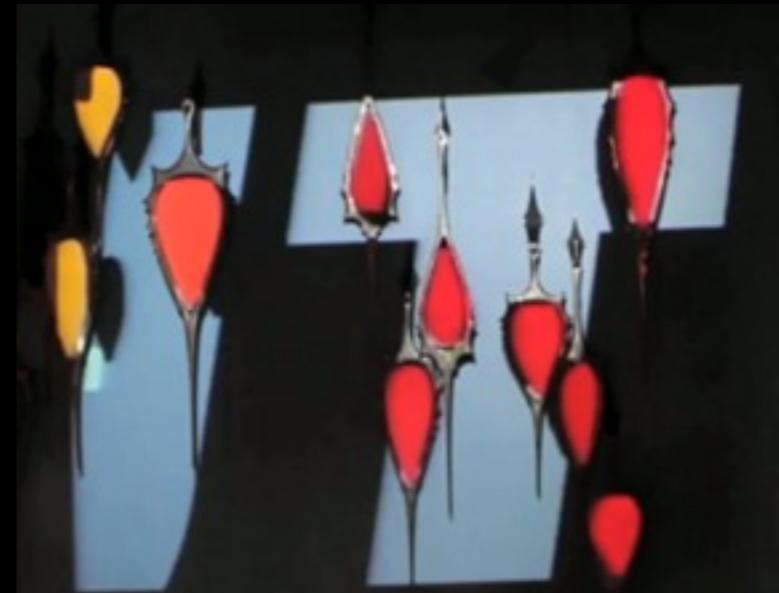
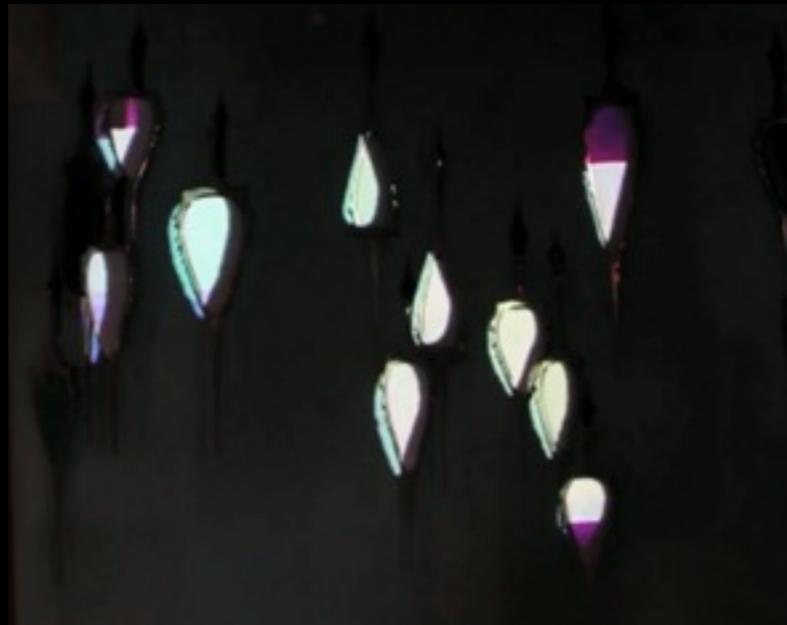


**c**

# Masking

Sometimes a projections does not need to be mapped but just masked and sometimes both are used.

Masking allows projection onto flat but irregular shapes so the projection outside its bounds is blacked out.



# Shadow and Lighting Effects

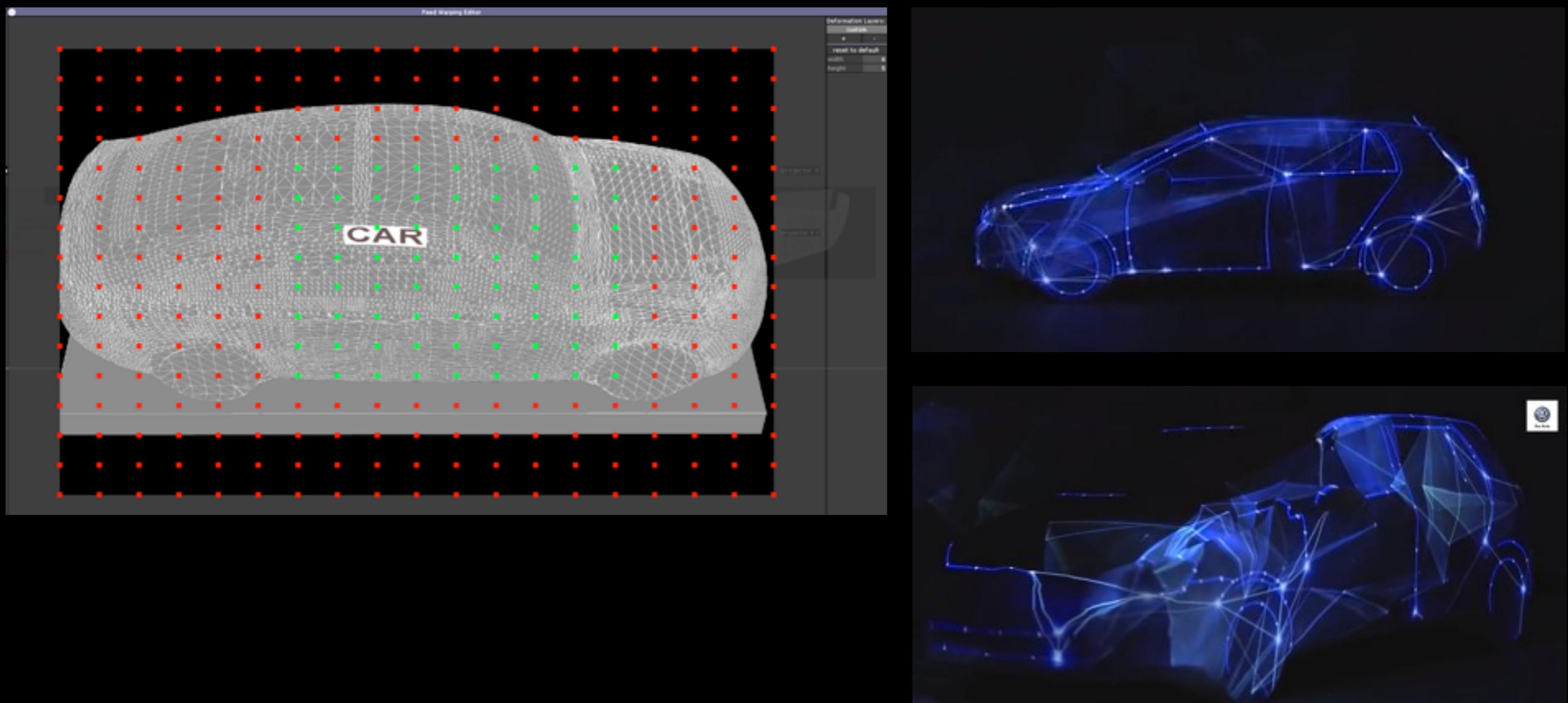
Playing with shading, shadows and lighting can create interesting optical effects (although these often only work from one point of view).



# 3D Mesh Warping

For more complex mappings, some software have options to use a 3d model and warp its mesh.

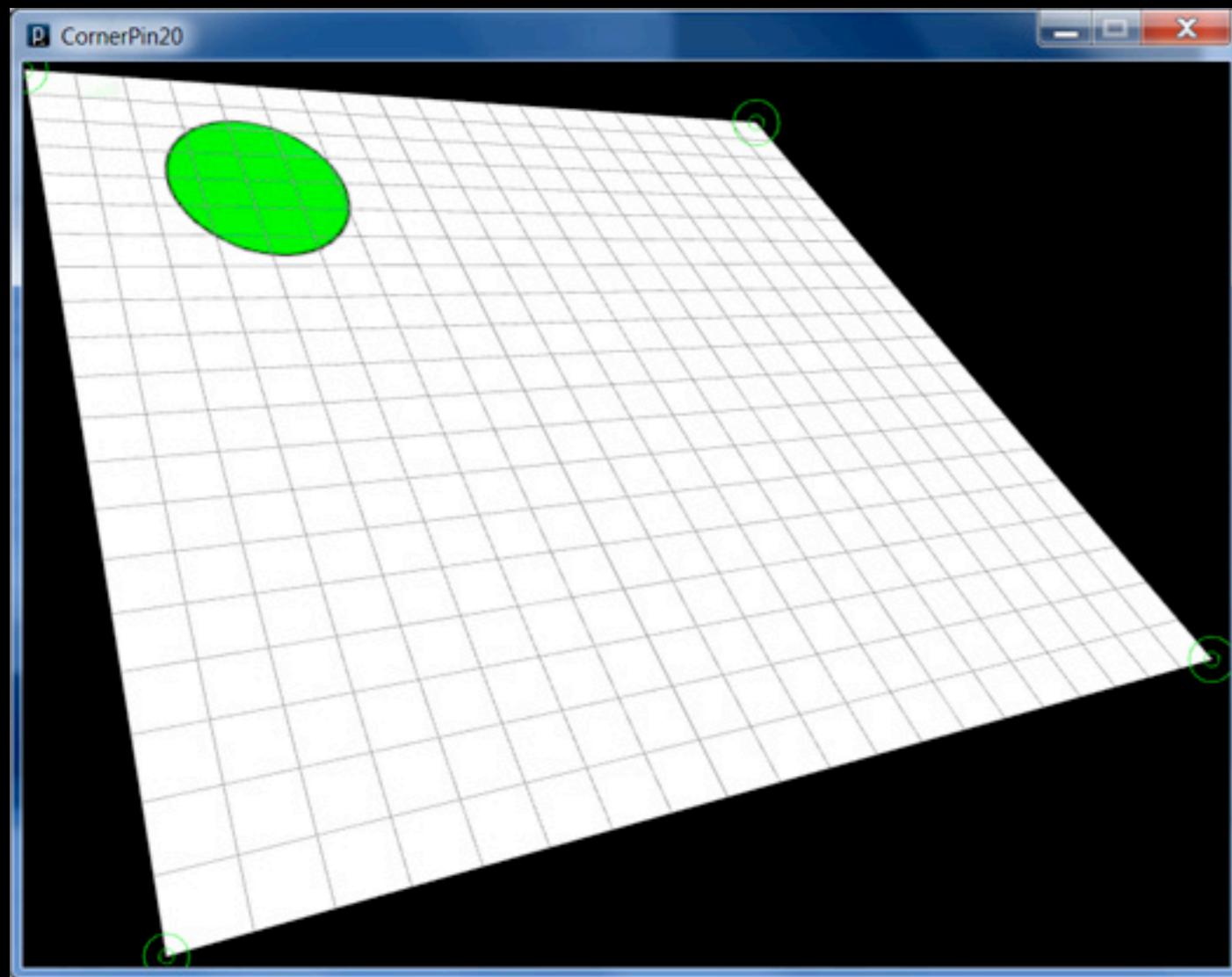
(We won't be working with this)



# Projection Mapping Tools

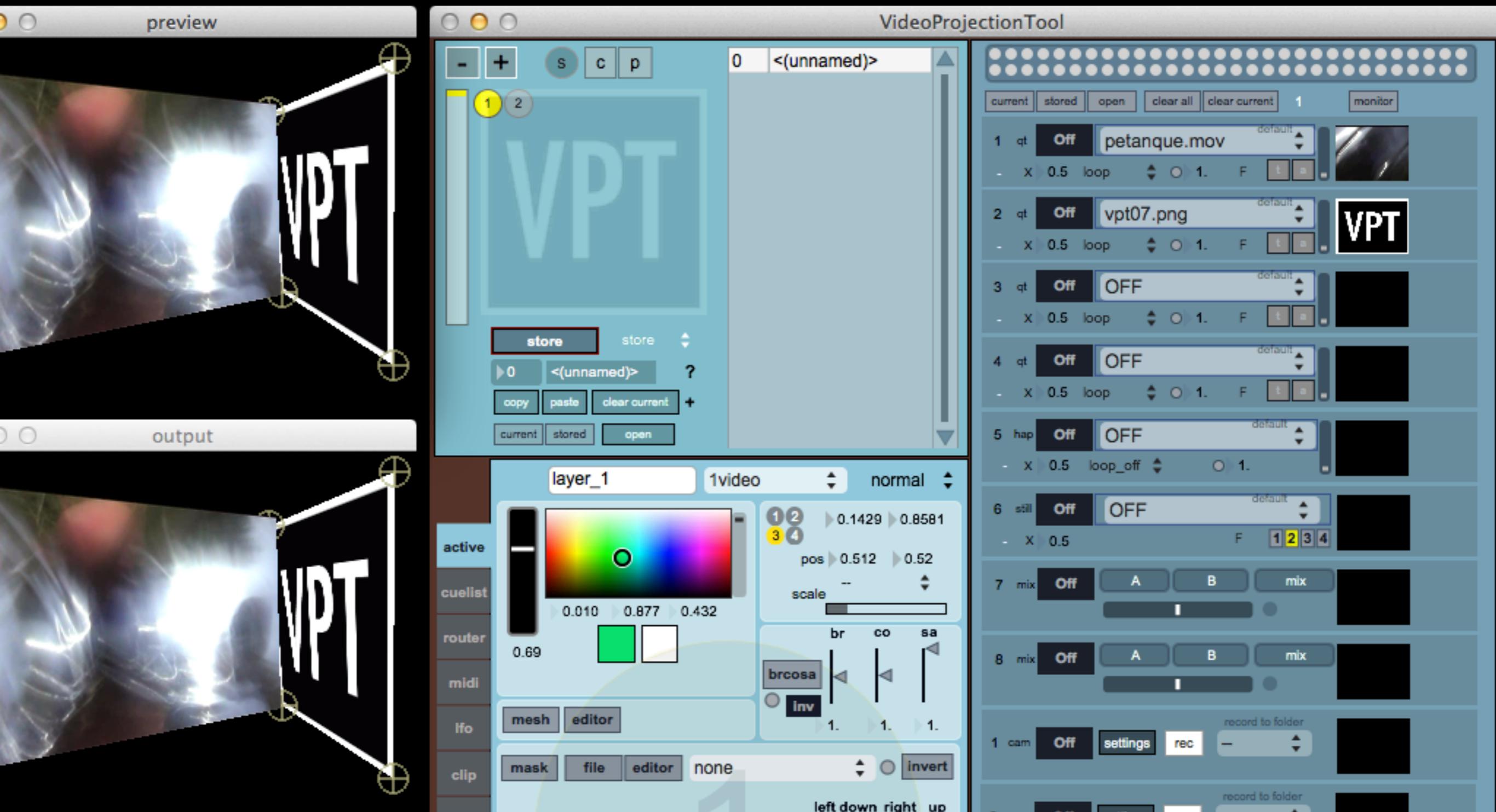
# Keystone

Simple warping library for Processing.

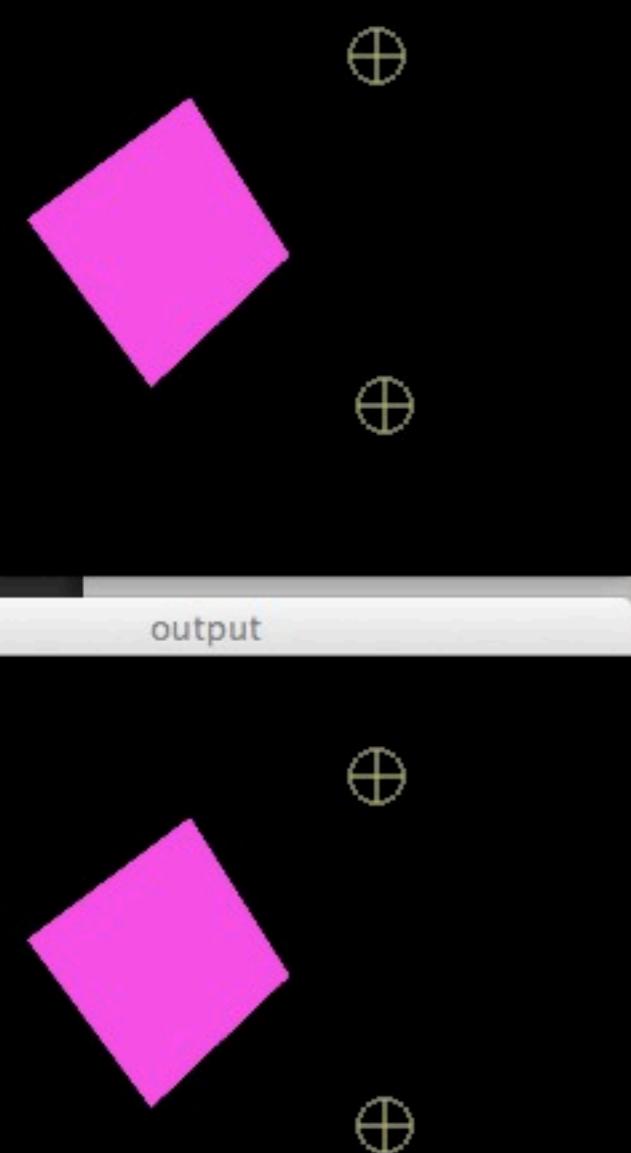


# Vpt

Free software for projection mapping.  
Tools to warp, mask, blend multiple videos or images.  
Options to use with siphon and osc.



preview



output

## syphon out

VPT can also send output to a syphon server.  
The syphon output is:

Syphon output is:

VideoProjectionTool

The screenshot displays the VideoProjectionTool (VPT) software interface. The main window shows a preview of a projection with large blue letters 'VPT'. A color palette and various controls like 'maskblur' and 'tile' are visible. To the right, a separate window titled 'p5\_syphon\_simple\_server' shows two video frames. The VPT interface includes tabs for 'active', 'cuelist', 'router', 'midi', 'ifo', 'clip', 'osc', 'serial', 'keys', and 'info'.

# Syphon

A system for sharing images/video between applications.

Two applications that have enabled syphon can share images or media output between them.

For example, we can play a sketch in Processing and use the syphon library to send the output animation (in real time) to Vpt where we can distort and mask it for projection.

Syphon is an SDK, plug-ins and a set of testing tools.

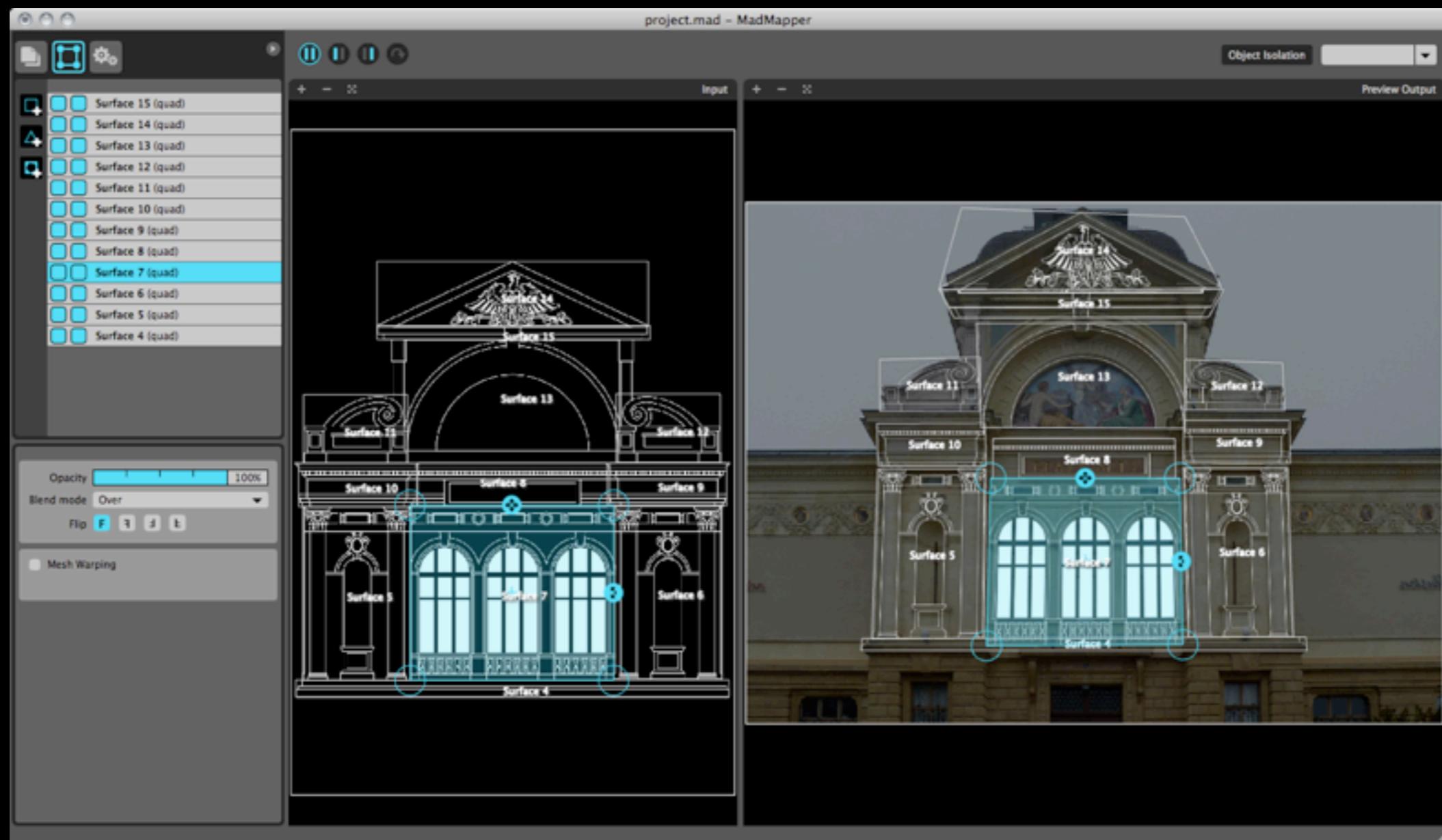


# Mad Mapper

Commercial software (200 euros student license) for projection mapping.

Widely used in industry.

Excellent tool with lots of options for sophisticated or complex projection mapping,  
(We won't be working with this)



How can we make meaningful or poetic changes to a space with projections?

Can augmentation with projection alter our perception of that space?



GORDON JACKSON