Advanced Animation Techniques

June 8, 2017

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Before we Begin…

- This will be recorded
- Slideshow PDF will be available
- KSPs will be available
- Computer: 3 GHz 8 Core (16-thread)
  2013 Mac Pro, 16 Gb RAM
- If you have questions…
- KeyShot Animation & Material Graph
  are Pro features

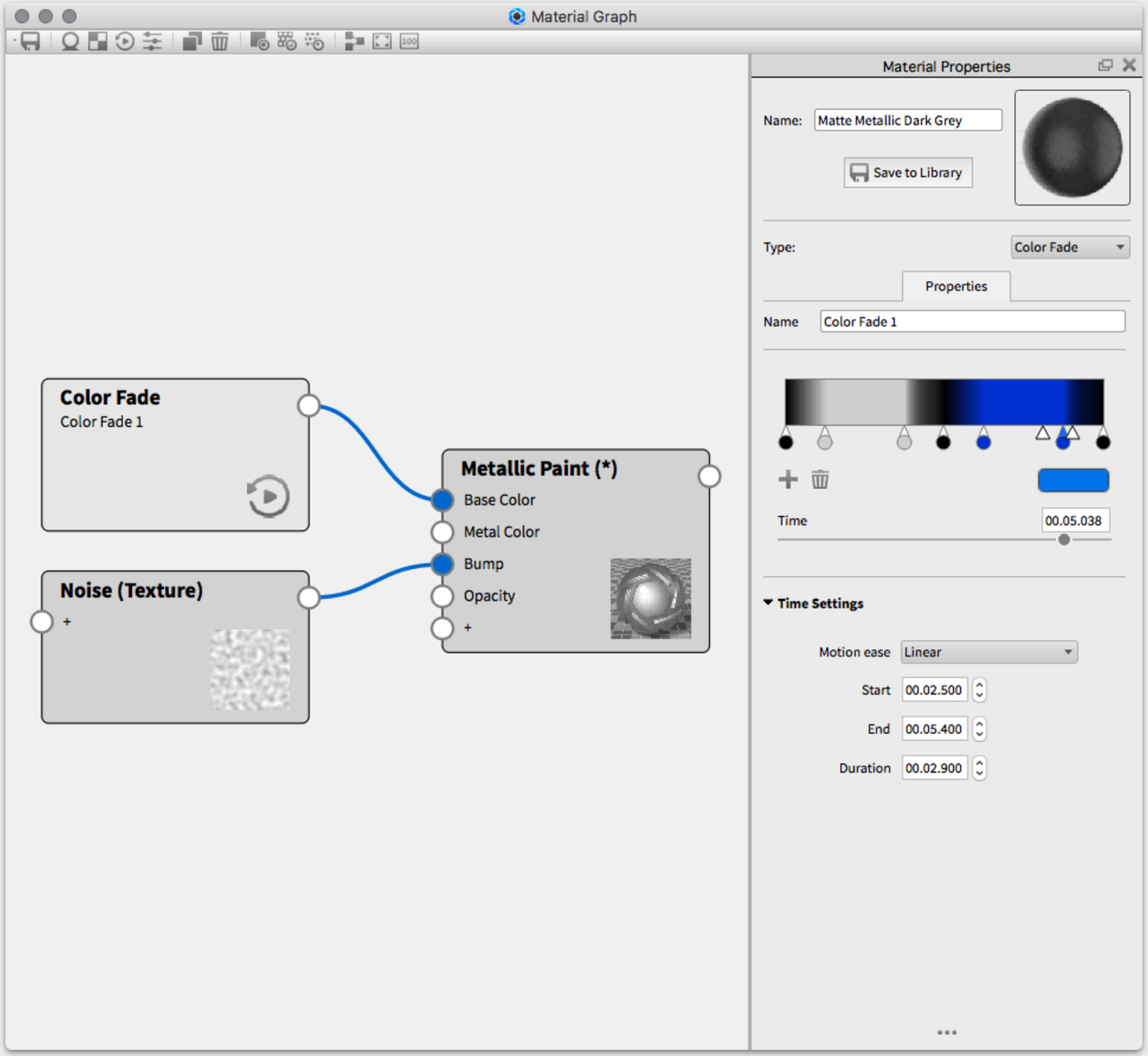
Topics

- Creating Material Animations
- How to Structure Advanced Animations
- Rendering Full Animations
- Hands on:
  - Color Fade
  - Number Fade
  - Complex Hinges
  - Parts & Model Animations
- Q & A

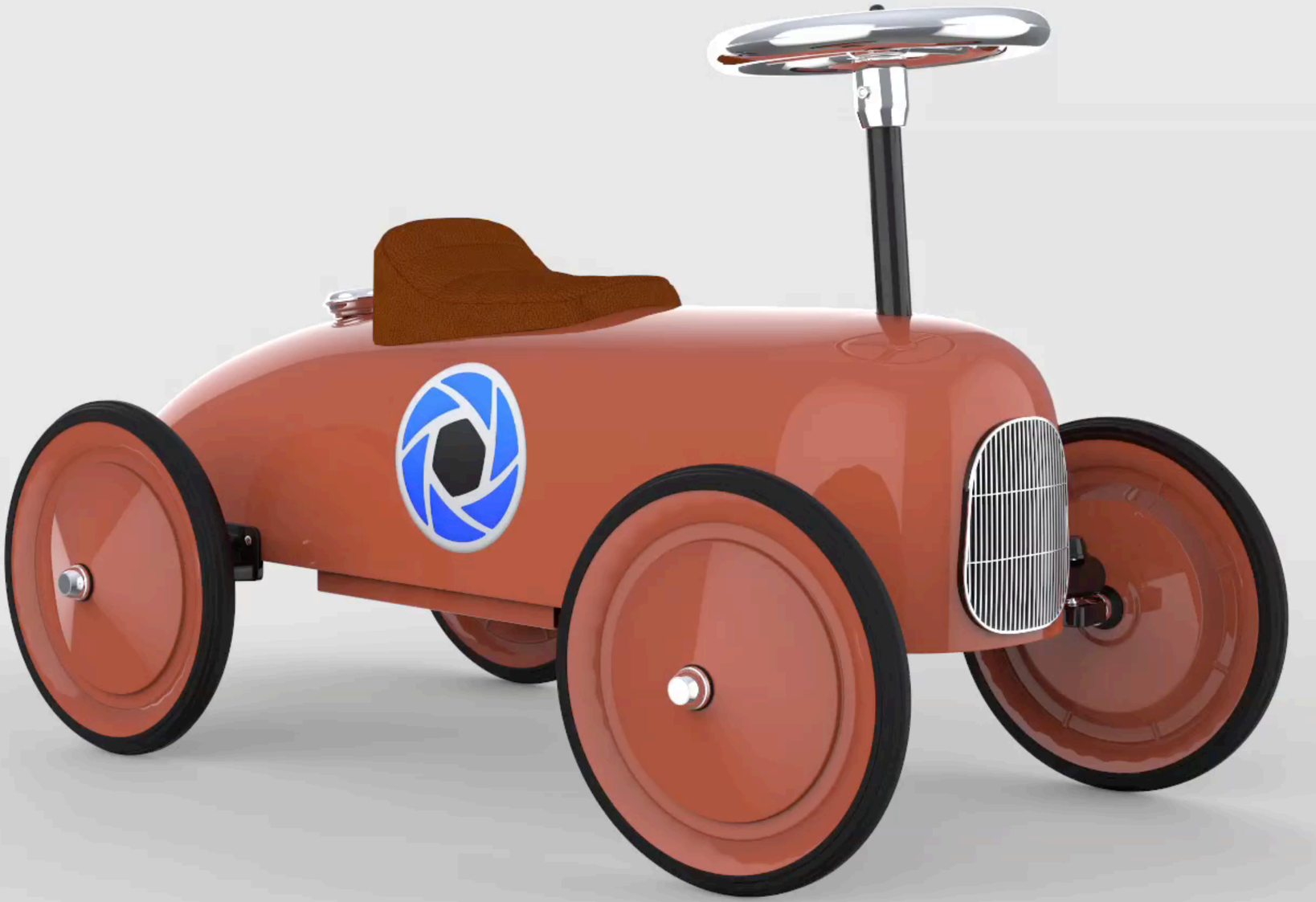
Creating Material Animations

Material Animations

- Can be created through the Material Graph
  - Color Fade
    - Fades colors over a period of time
    - ex. Color Variations
  - Number Fade
    - Fades from one value to another over time
    - ex. Changing values in textures
  - Color Fade to Number Utility Node
    - Use Colors to drive numerical values
    - ex. Texture moving up and down



Color Fade



KeyShot 6.3 Pro - Retro ride on metal car.bip - 64 bit

CPU Usage 88 %

Project Scene

Scene | Mater... | Envir... | Lighti... | Camera | Image

Show | Search All

Parts

- Models
  - Retro ride on metal car_obj
    - Spin 1
    - Spin 2
    - Spin 3
    - 01___Default
    - 01___Default — Tire
    - 01___Default
    - 01___Default — Chro
    - 01___Default
    - 01___Default — Leat
    - 01___Default — Chro
- Cameras
  - Free Camera
  - Camera 1
- Scene Sets

Scene | Materials

Name	Type
Chrome Polished	Metal
Leather	Diffuse
Paint Gloss Black	Paint
Paint w Animation	Paint
Tire	Plastic

Animation — Timeline

Animation Wizard | FPS: 30

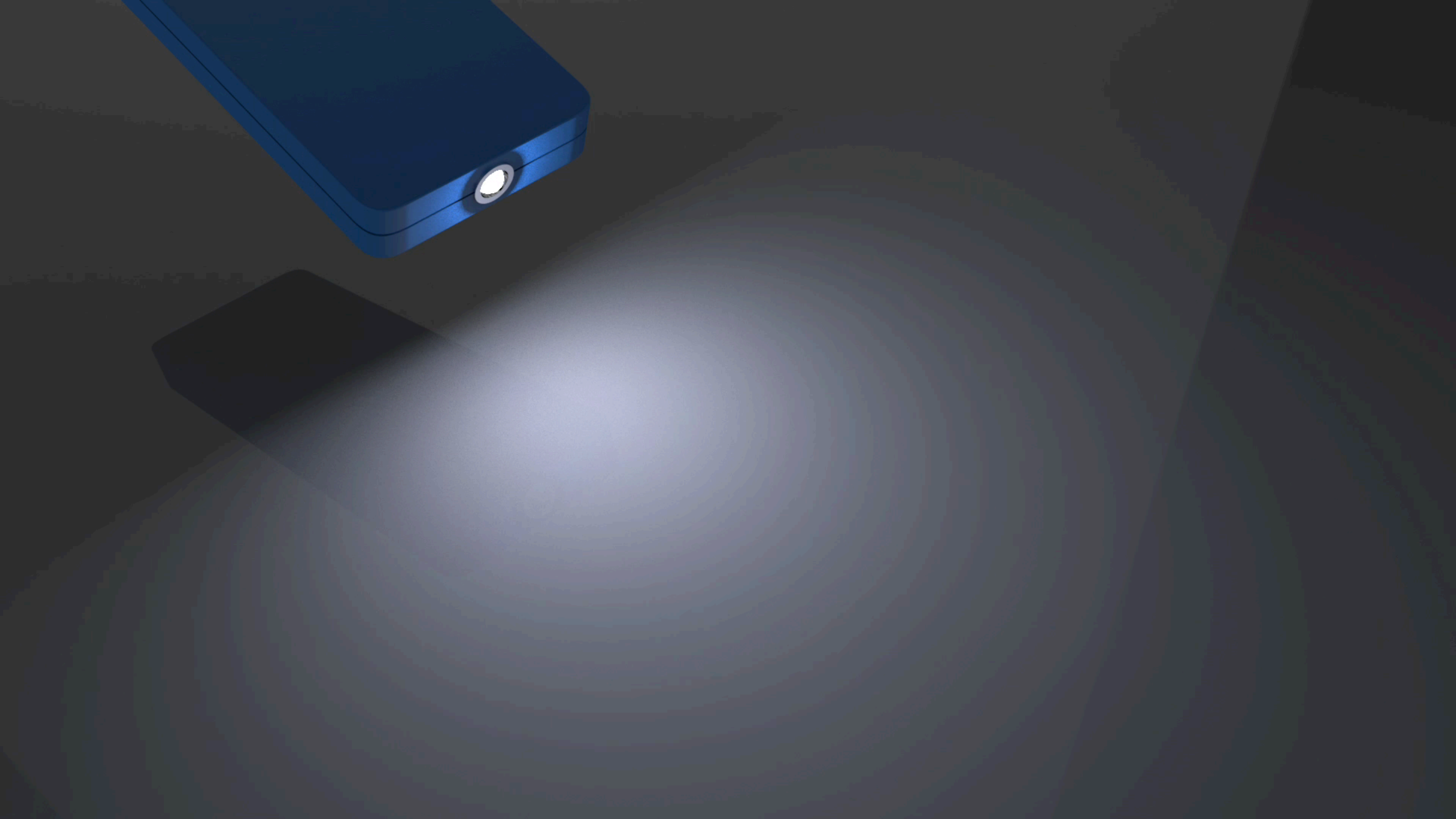
00:00:000 / Frame 1

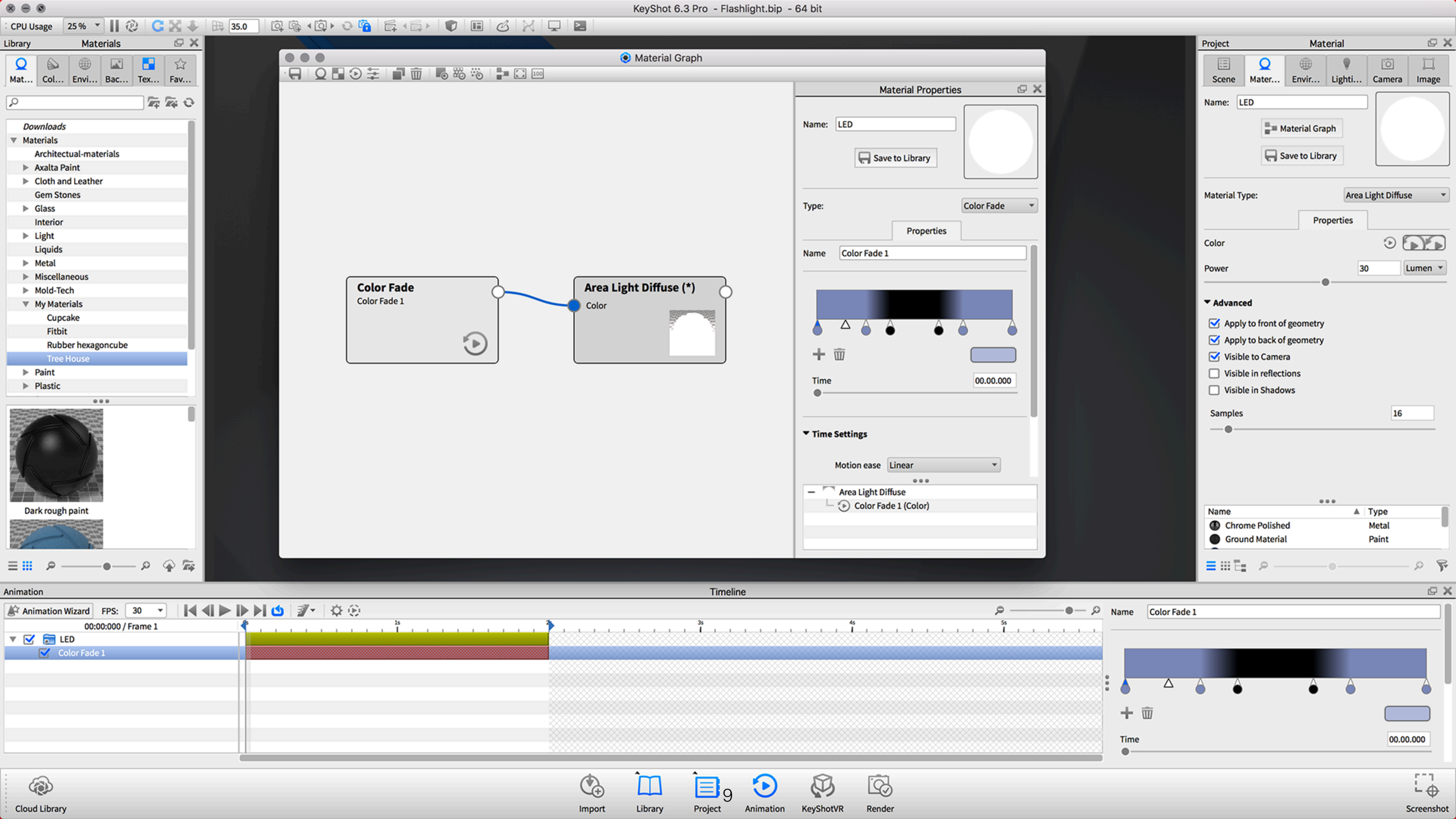
- Paint
  - Color Fade 1
- Spin 1
- Spin 2
- Spin 3

Name: Color Fade 1

Time: 00.00.000

Cloud Library | Import | Library | Project | Animation | KeyShotVR | Render | Screenshot




KeyShot 6.3 Pro - Flashlight.bip - 64 bit
Material Graph
Color Fade
Color Fade 1
Area Light Diffuse (*)
Color
Material Properties
Name: LED
Save to Library
Type: Color Fade
Properties
Name Color Fade 1
Time 00.00.000
Time Settings
Motion ease Linear
Area Light Diffuse
Color Fade 1 (Color)
Material Type: Area Light Diffuse
Color
Power 30 Lumen
Advanced
Apply to front of geometry
Apply to back of geometry
Visible to Camera
Visible in reflections
Visible in Shadows
Samples 16
Chrome Polished Metal
Ground Material Paint
Dark rough paint
Timeline
Animation Wizard
FPS: 30
00:00:000 / Frame 1
LED
Color Fade 1
Cloud Library
Import
Library
Project
Animation
KeyShotVR
Render
Screenshot

Number Fade

KeyShot 6.3 Pro - Nesting Dolls.bip - 64 bit

CPU Usage 88 %

Project Scene

Scene | Mater... | Envir... | Lighti... | Camera | Image

Show | Search All

Parts

- Models
  - Russian dolls
    - Doll 1
    - Doll 2
    - Doll 3
    - Doll 4
    - Doll 5
  - Cameras
  - Scene Sets

Scene | Materials

Name	Type
Doll 1	Paint
Doll 2	Paint
Doll 3	Paint
Doll 4	Paint
Doll 5	Paint

Animation Timeline

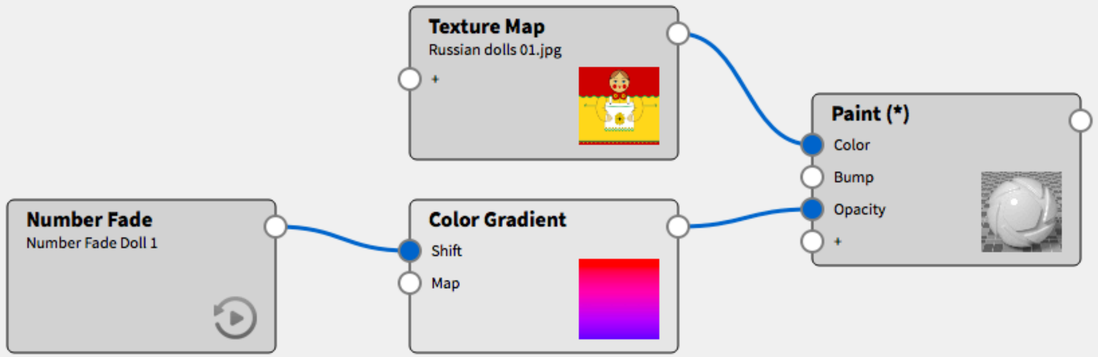
Animation Wizard | FPS: 30

00:00:000 / Frame 1

- Number Fades
  - Number Fade Doll 1
  - Number Fade Doll 2
  - Number Fade Doll 3

Cloud Library | Import | Library | Project | Animation | KeyShotVR | Render | Screenshot

Material Graph



Material Properties

Name: Doll 1

Save to Library

Type: Color Gradient

Properties | Textures

Mapping Tool | Reset

Location 0

Gradient Type: Planar

Scale 1

Angle 0°

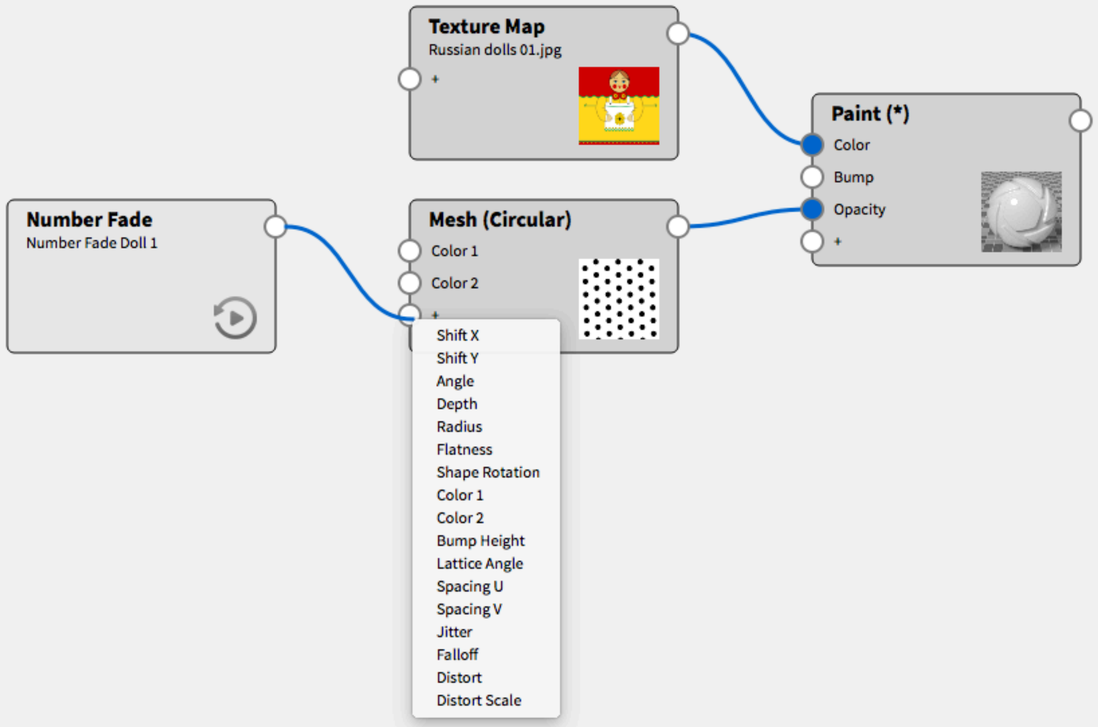
Shift 150

Invert

Repeat

Sync

Material Graph



Material Properties

Name: Doll 1

Save to Library

Type: Mesh (Circular)

Properties | Textures

Mapping

Color 1

Color 2

Bump Height 0.1

Lattice

Shape

Noise

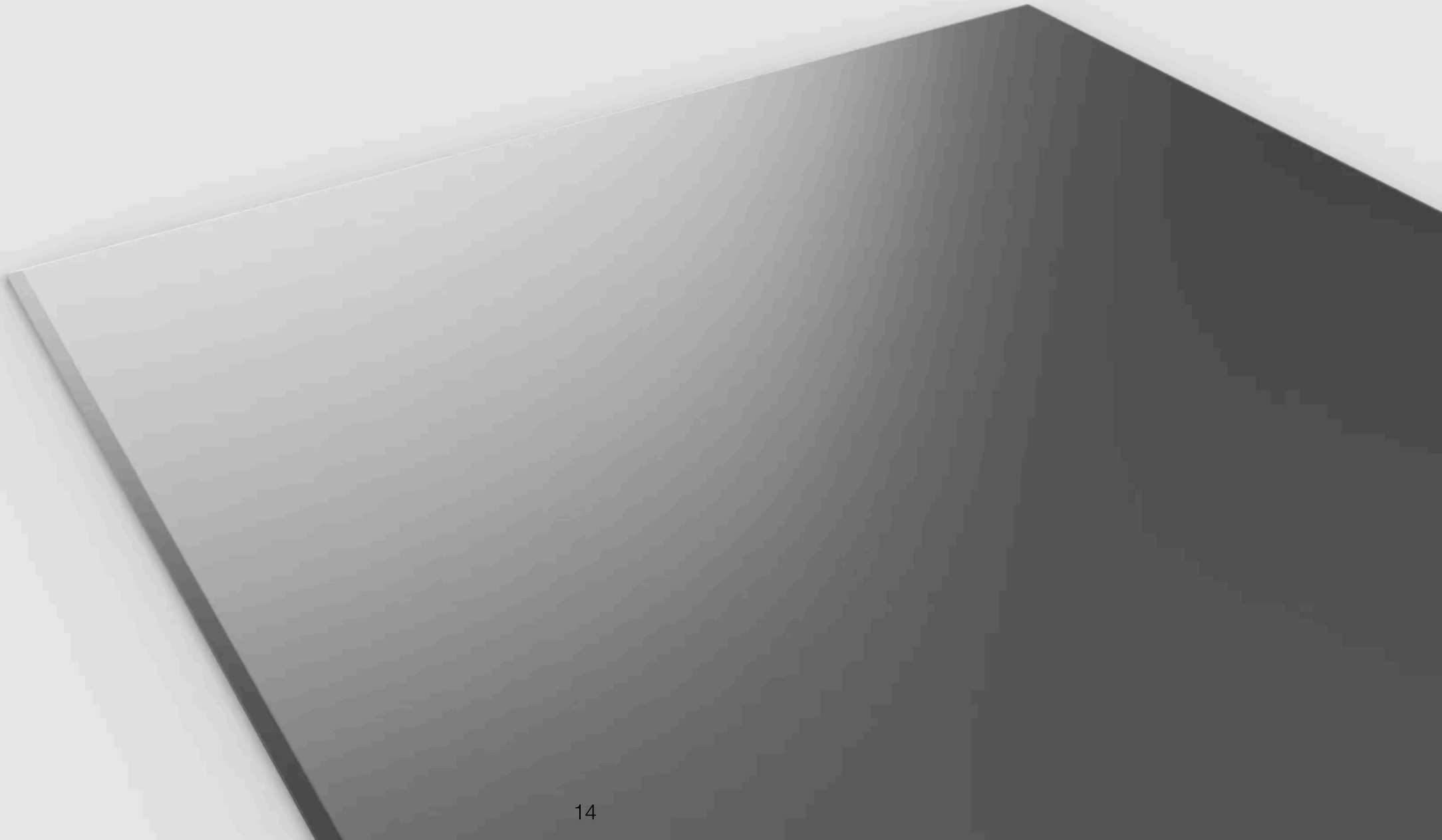
Jitter 0

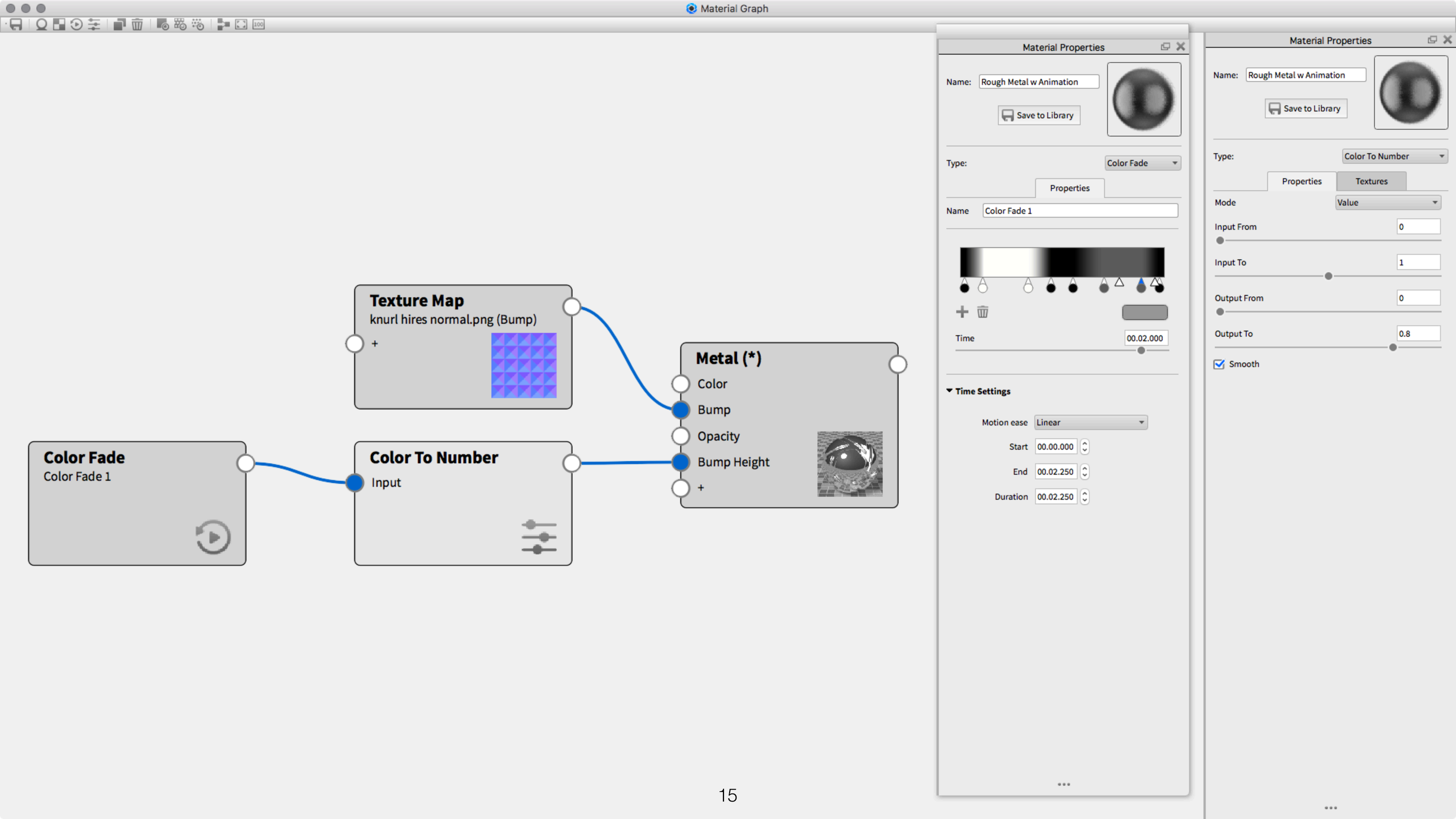
Distort 0

Distort Scale 1

Sync

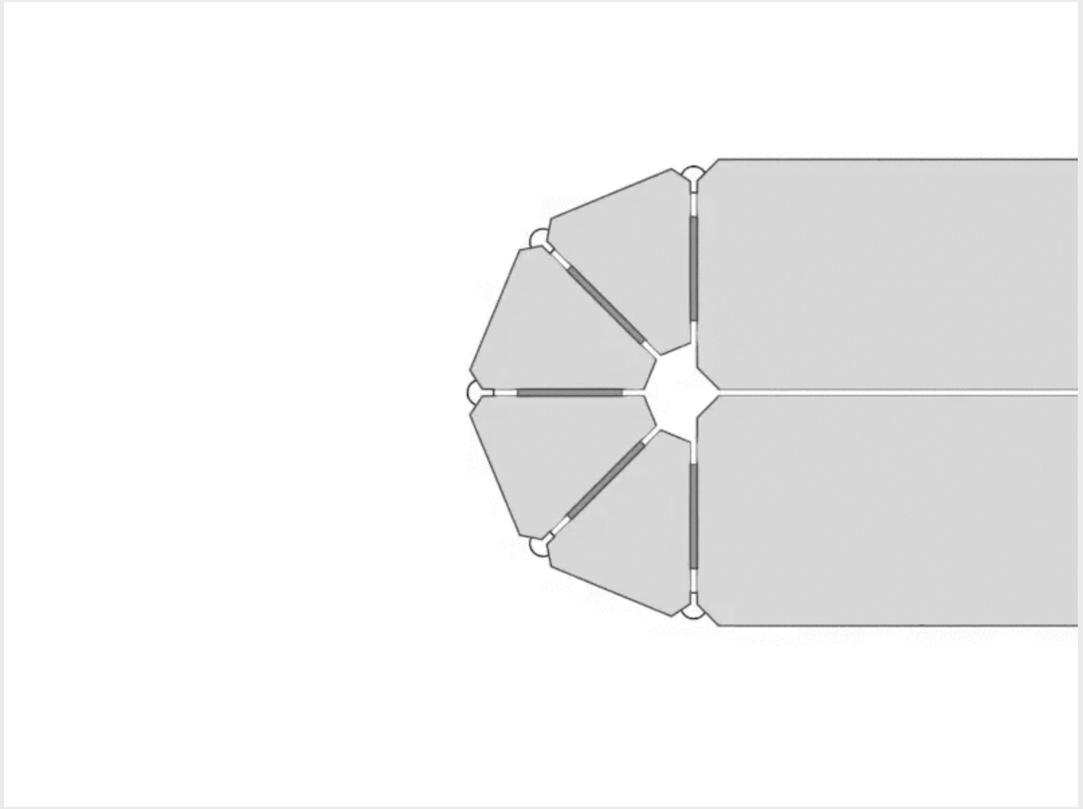
Color Fade through Color to Number Utility Node

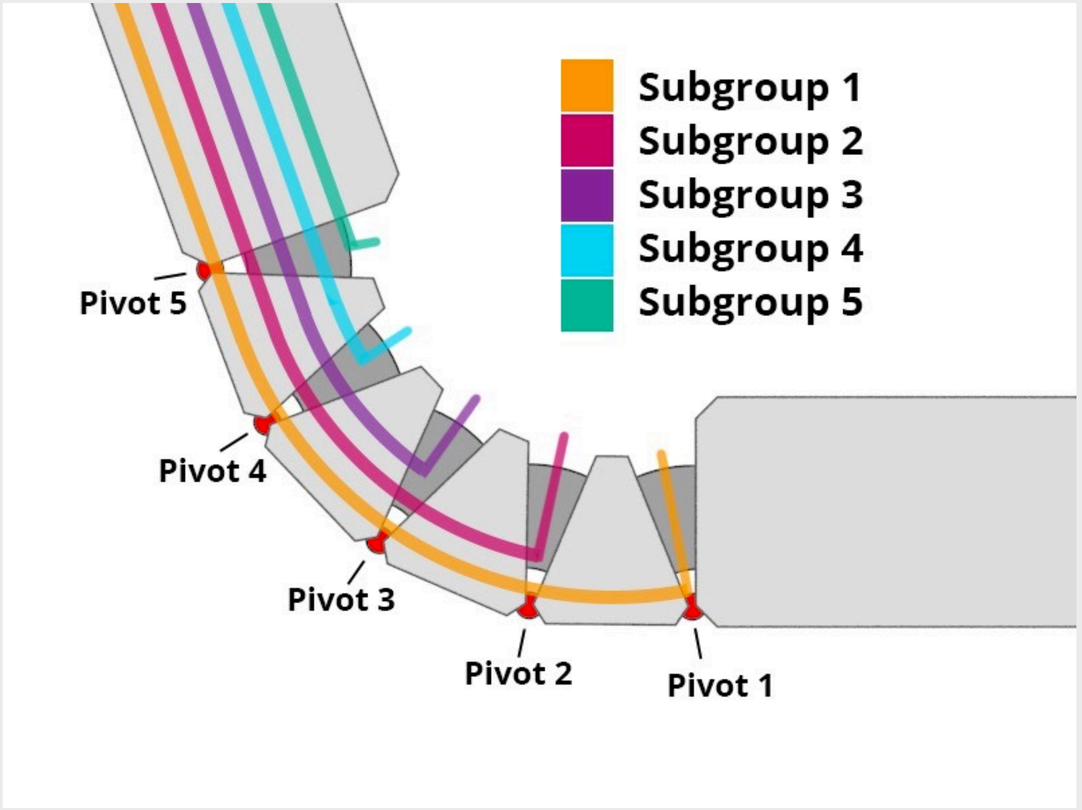



Material Graph
Texture Map
knurl hires normal.png (Bump)
+
Color Fade
Color Fade 1
Color To Number
Input
Metal (*)
Color
Bump
Opacity
Bump Height
+
Material Properties
Name:
Rough Metal w Animation
Save to Library
Type:
Color Fade
Properties
Name
Color Fade 1
Time
00.02.000
Time Settings
Motion ease
Linear
Start
00.00.000
End
00.02.250
Duration
00.02.250
Material Properties
Name:
Rough Metal w Animation
Save to Library
Type:
Color To Number
Properties
Textures
Mode
Value
Input From
0
Input To
1
Output From
0
Output To
0.8
Smooth

How to Structure Advanced Animations

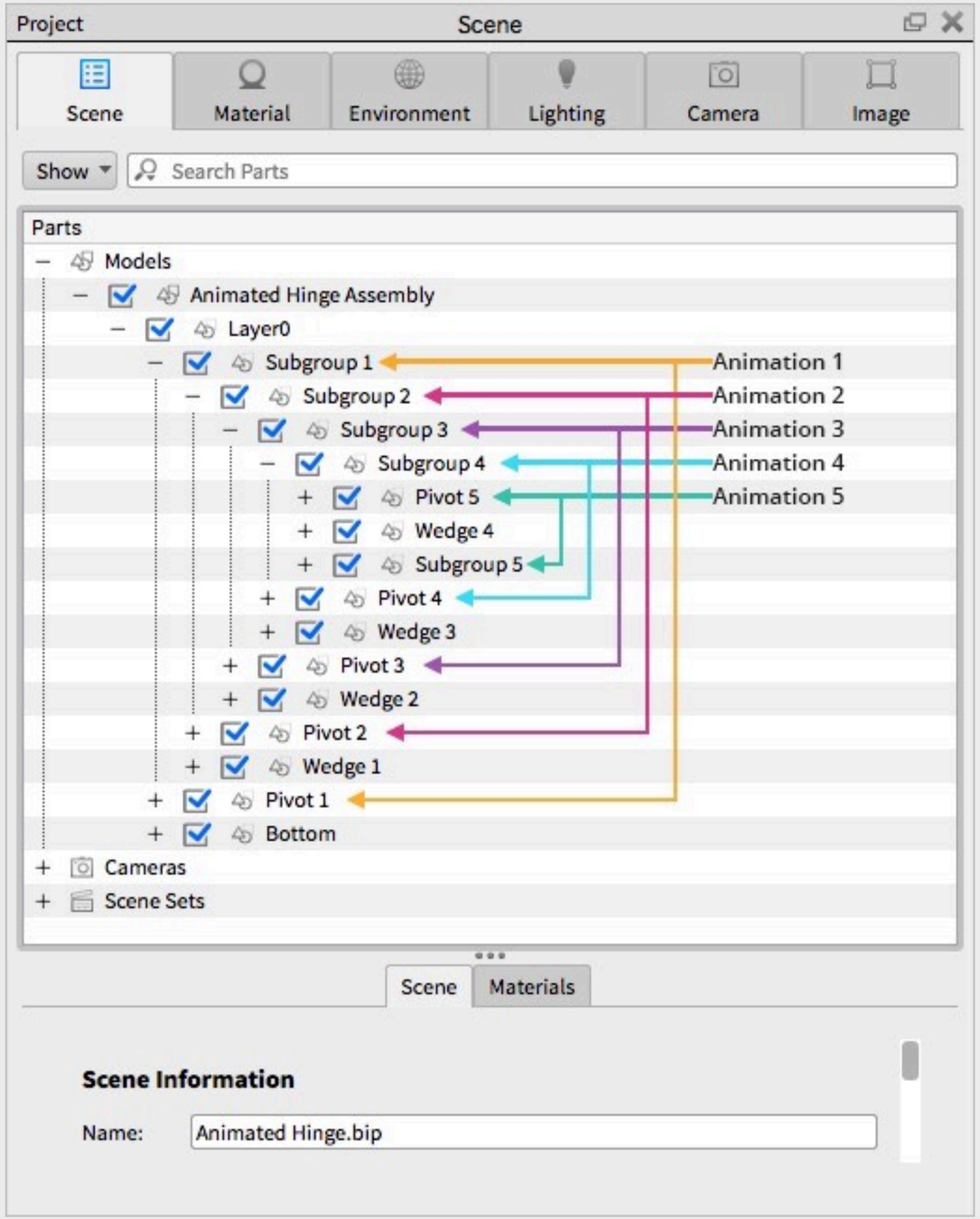
Structuring Advanced Animations





Structuring Advanced Animations

- Scene Hierarchy is key
- Nested geometry yields nested animations
- Rotation Animations can use any pivot point
- Assembly structures are preferred due to Global vs Assembly vs Part axis



KeyShot 6.3 Pro - Laptop Animation.bip - 64 bit

CPU Usage 88 %

Geometry View

Edit Geometry

Angle 1

Angle 0

Project Scene

Scene | Mater... | Envir... | Lighti... | Camera | Image

Show | Search All

Parts	Materials
Models	-
Laptop Assembly	-
Cameras	
Free Camera	-
Angle 2	-
Angle 3	-
Angle 1	-

Scene | Materials

Scene Information

Name: Laptop Animation.bip

Units: Millimeter

Parts: 37

Triangles: 2,508,642

Materials: 6

Cameras: 4

Animation

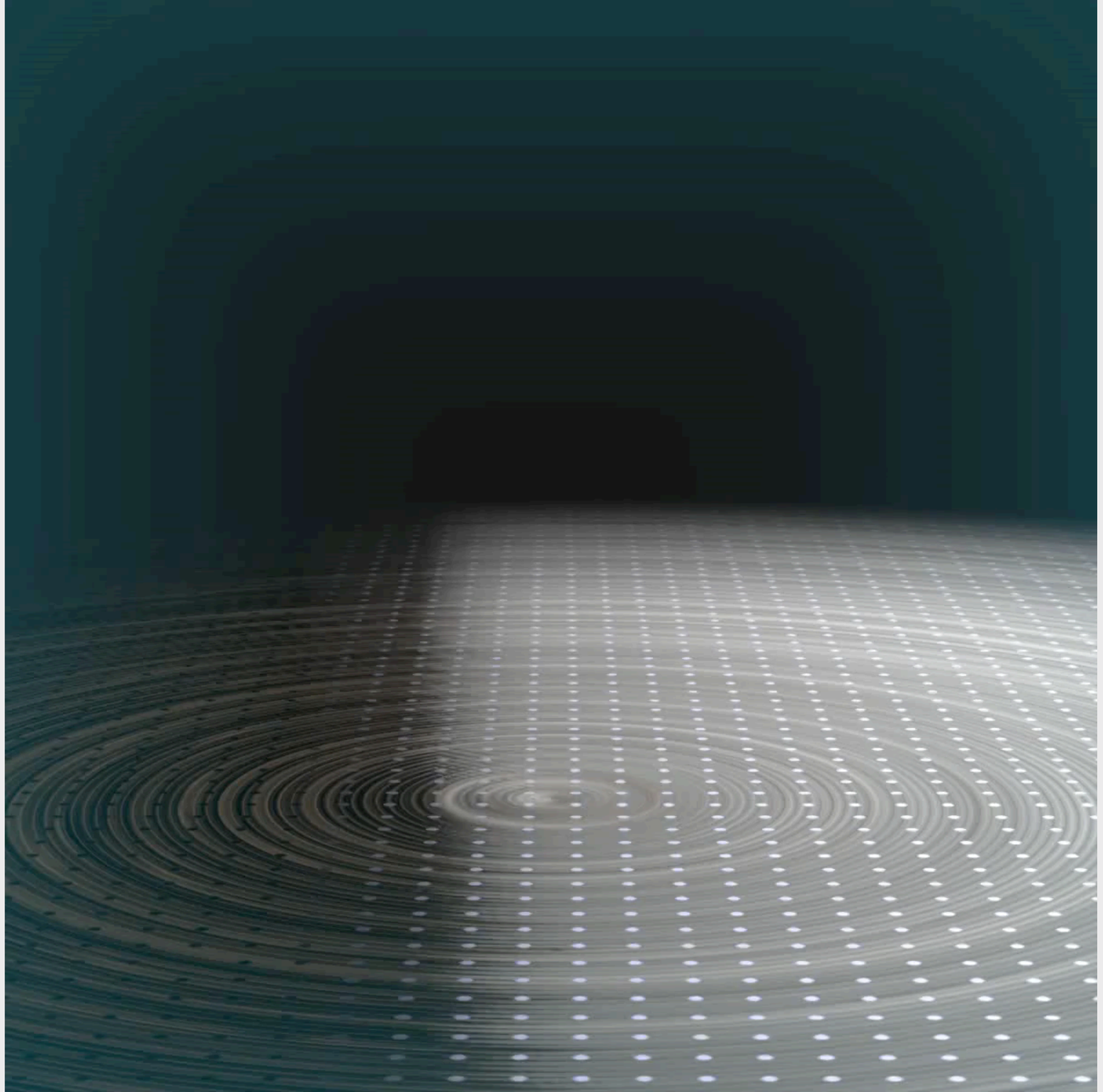
Timeline

Animation Wizard FPS: 30

00:09:733 / Frame 293

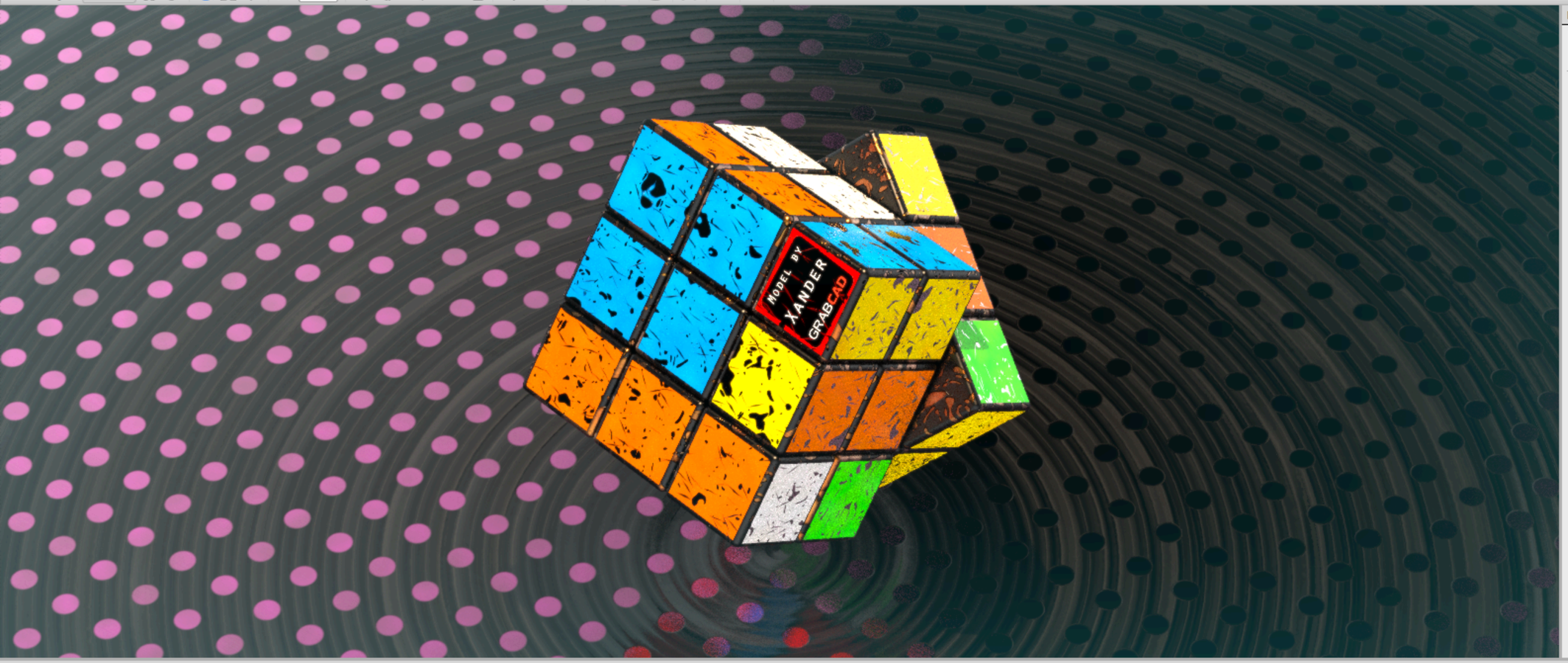
- Body Color Change
- Angle 0 to 1
- Lid Open
- Angle 1 to 2
- Angle 2 to 3
- Tablet Switch
- Angle 1 - Orbit
- Angle 2 - Dolly
- Angle 2 - Rotation
- Angle 2 - Translation
- Lid Open Partial
- Laptop Upright
  - Laptop Assembly Rotation
  - Laptop Assembly Up
  - Laptop Assembly Down
- Angle 3 - Orbit
- Angle 3 - Translation

Cloud Library | Import | Library | Project | Animation | KeyShotVR | Render | Screenshot



KeyShot 6.3 Pro - advanced_animation.bip - 64 bit

CPU Usage 88 %



Project Camera

Scene Mater... Envir... Lighti... Camera Image

Free Camera
CAM 01 (unsaved)

Name CAM 01

Position and Orientation

Lens Settings

Lens Effects

Animation Timeline

Animation Wizard FPS: 30

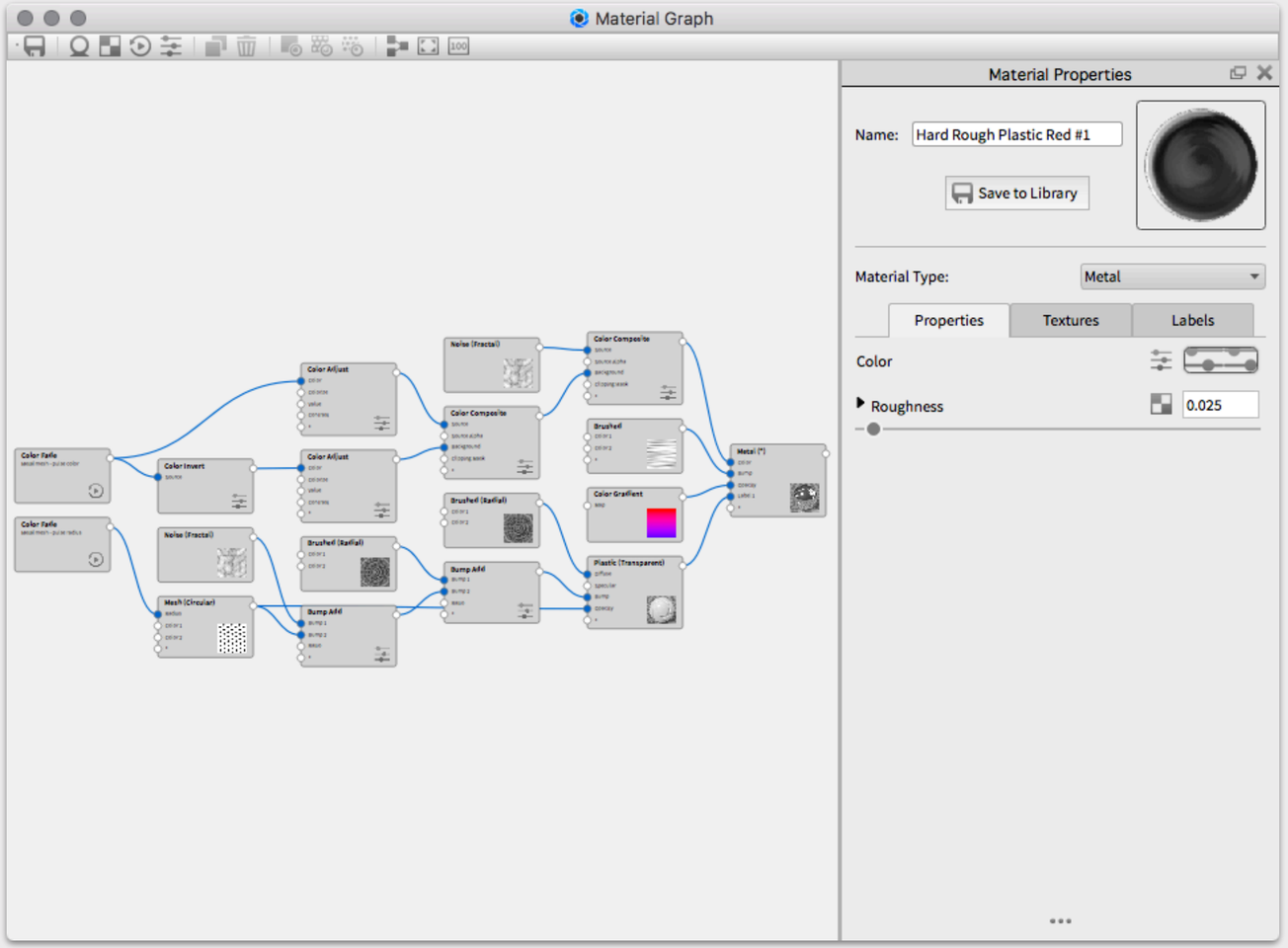
00:10:533 / Frame 317

Rubik's Cube - Reverse-solve
Sink Cube - init
Raise Cube - BEGIN
Camera - IN
Rubik's Cube - Solve
Cube - Rotations
Camera - OUT
Cube - Final spin
Rubik's Cube - fade out
Metal mesh - Pulsing
Ground plane - rotation

Cloud Library Import Library Project Animation KeyShotVR Render Screenshot

Advanced Animation Example

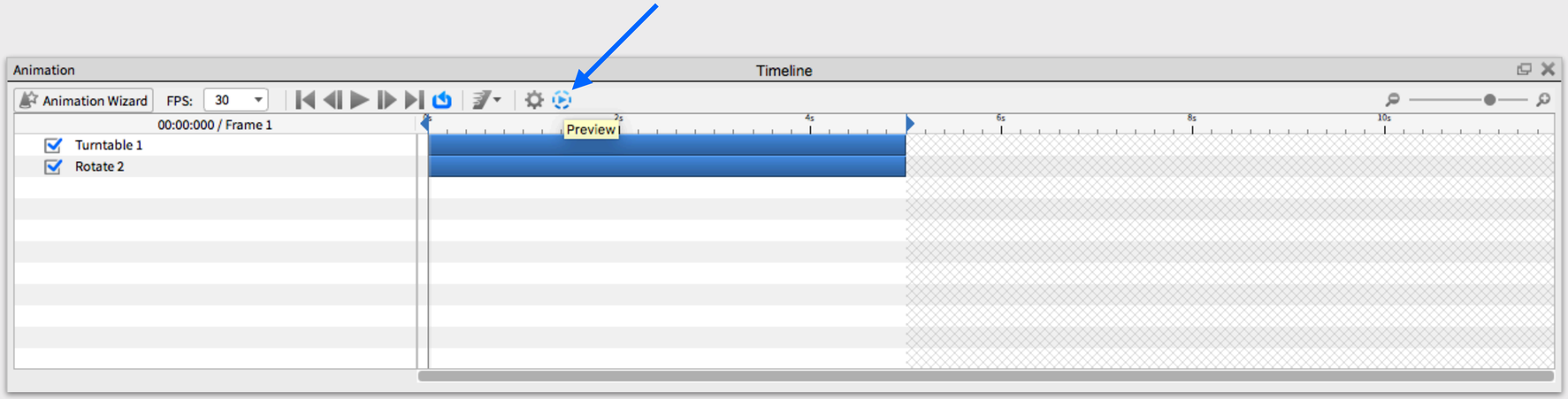
- In KeyShot 6 Resources Folder
  - Great example of part, camera, and material animations
  - Scenes > advanced_animation.bip



Rendering Full Animations

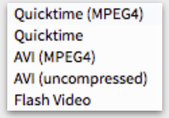
Best Practices

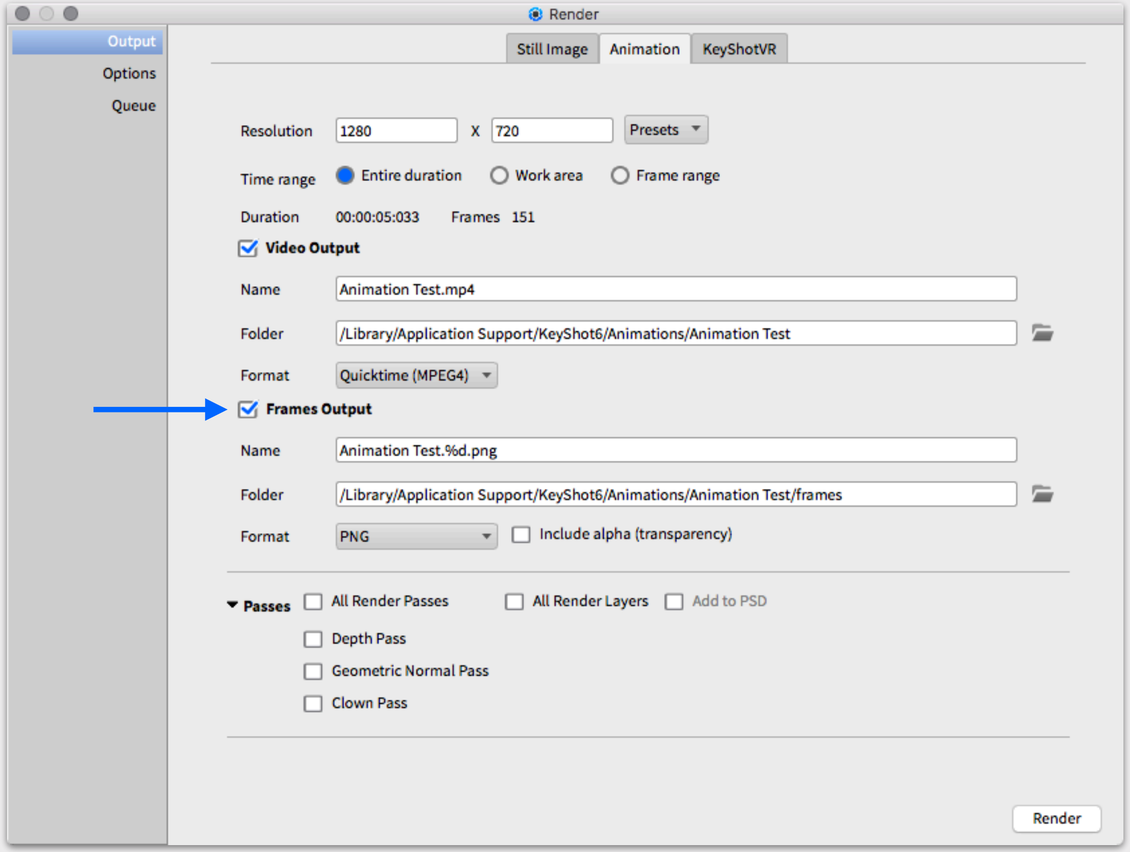
- Use Geometry Editor to see faster part/model animations
- Render preview animations to verify settings
- Find the bare minimum quality settings to render a single frame, then use those settings for full animation
- Max Time is great for quick animations



Best Practices

- Uncompressed Video is best and can always be downsampled
  - Quicktime & AVI (uncompressed) are higher quality options
- Always save out frames (just in case)
  - Helpful for re-compiling in any video format
  - Backup in case animation is lost
- Frames > Video
  - Quicktime Pro ($30) Mac/Win
  - ImageJ (free) Mac/Win
  - Adobe Premiere Pro

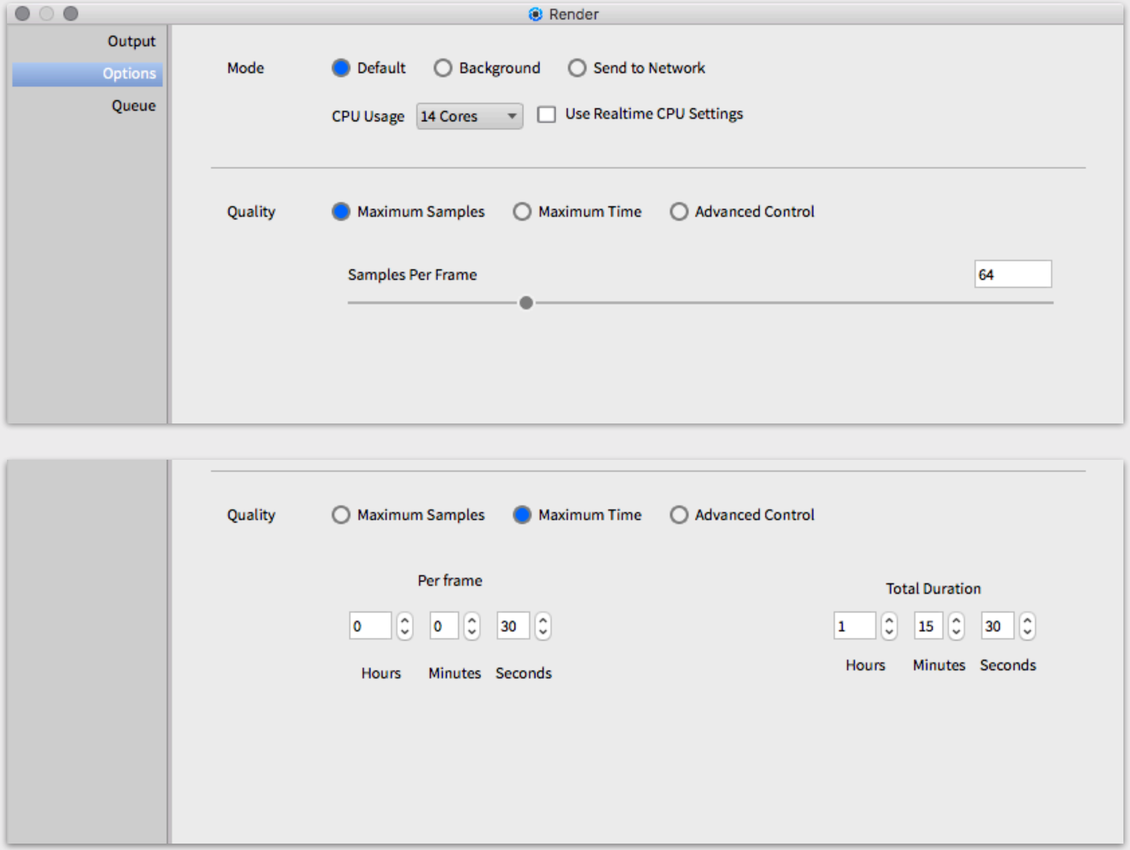




Quality Settings - Max Samples/Time

- Max Samples and Max Time are equivalent to realtime view
  - Max samples: use realtime Heads-Up Display to estimate number of frame samples needed
  - Max Time: specify time for frames or complete animation.
- Easy to Use
- Supports Interior Mode, Motion Blur, Caustics

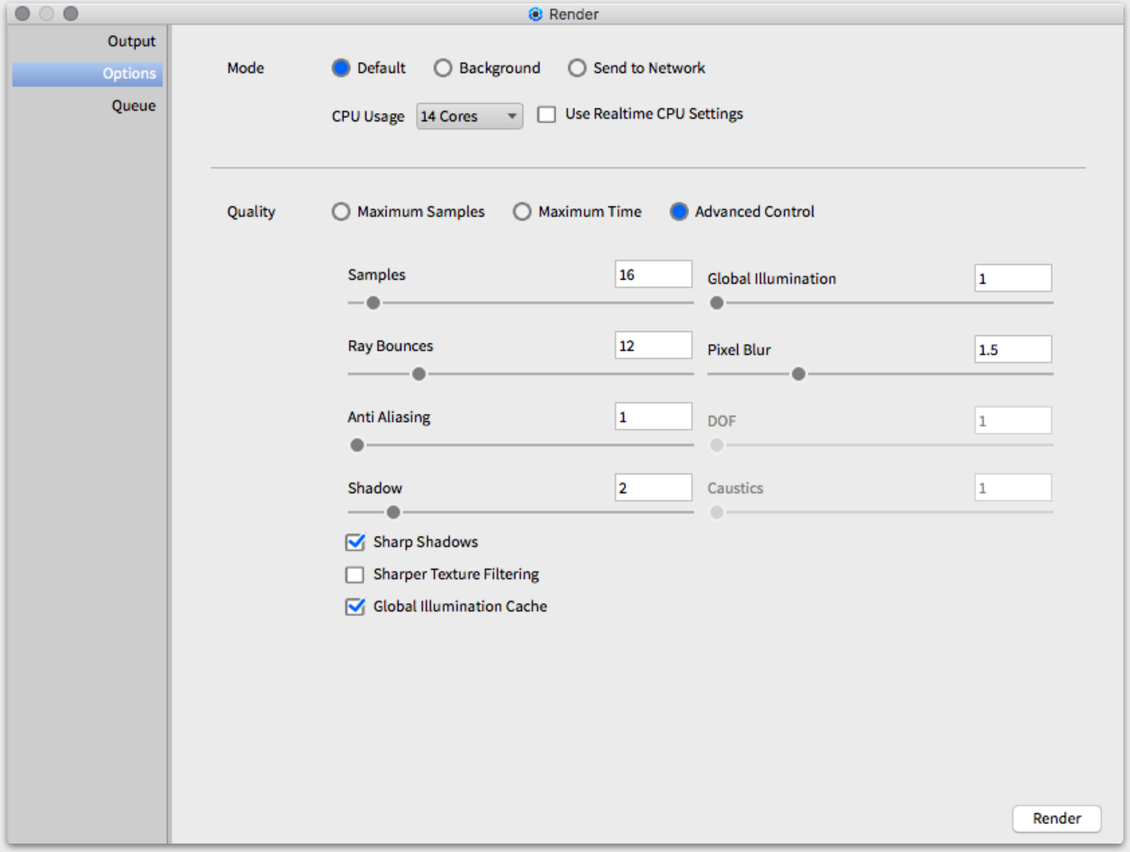
- Can be slower than Advanced Control
- Max Time cannot be used with Network Rendering



Quality Settings - Advanced Control

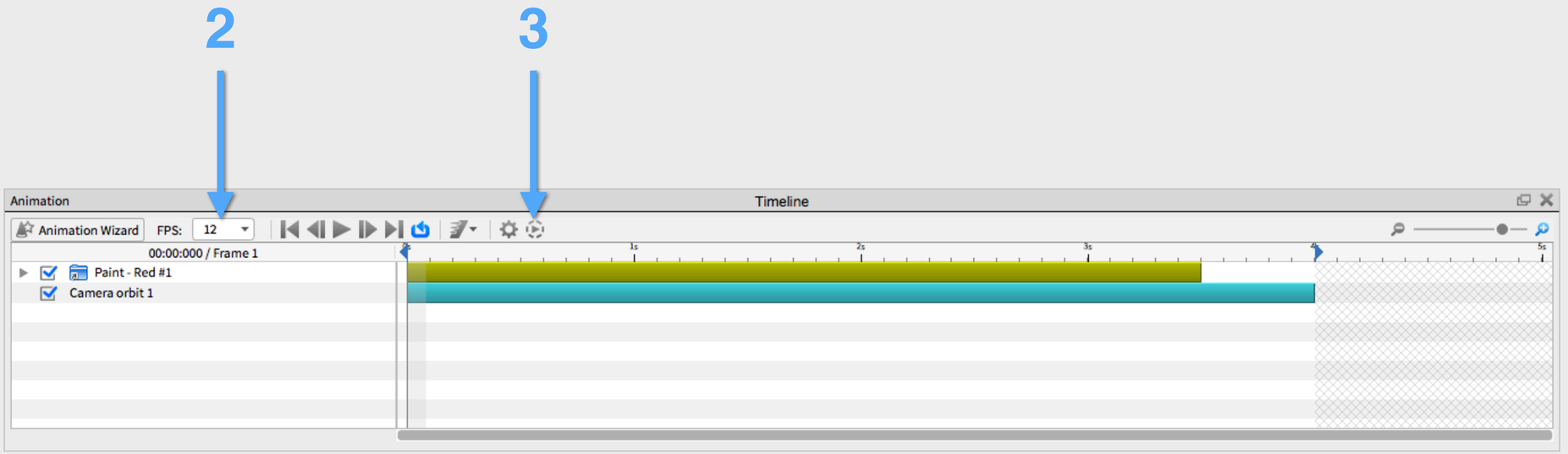
- Different algorithm than realtime view
  - Consistent, fast results for simple scenes
  - Can be fine tuned

  - Harder to use
  - Settings can easily be excessive:
    - Samples is *per pixel*, multiplied by material samples
  - Incompatible with Interior Mode & Motion Blur



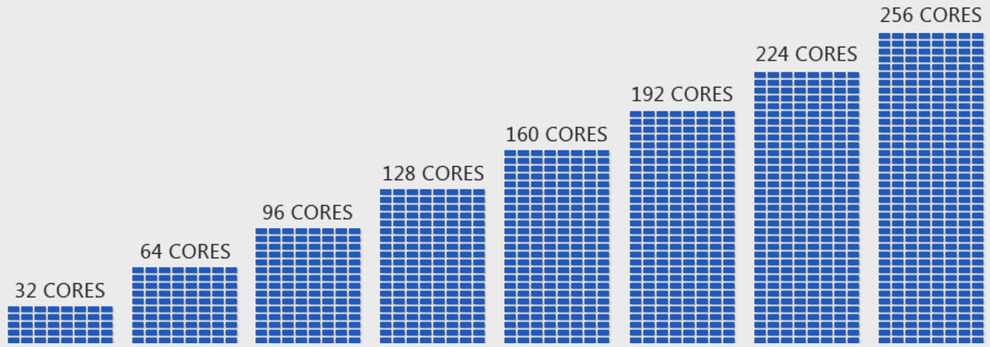
In a Hurry?

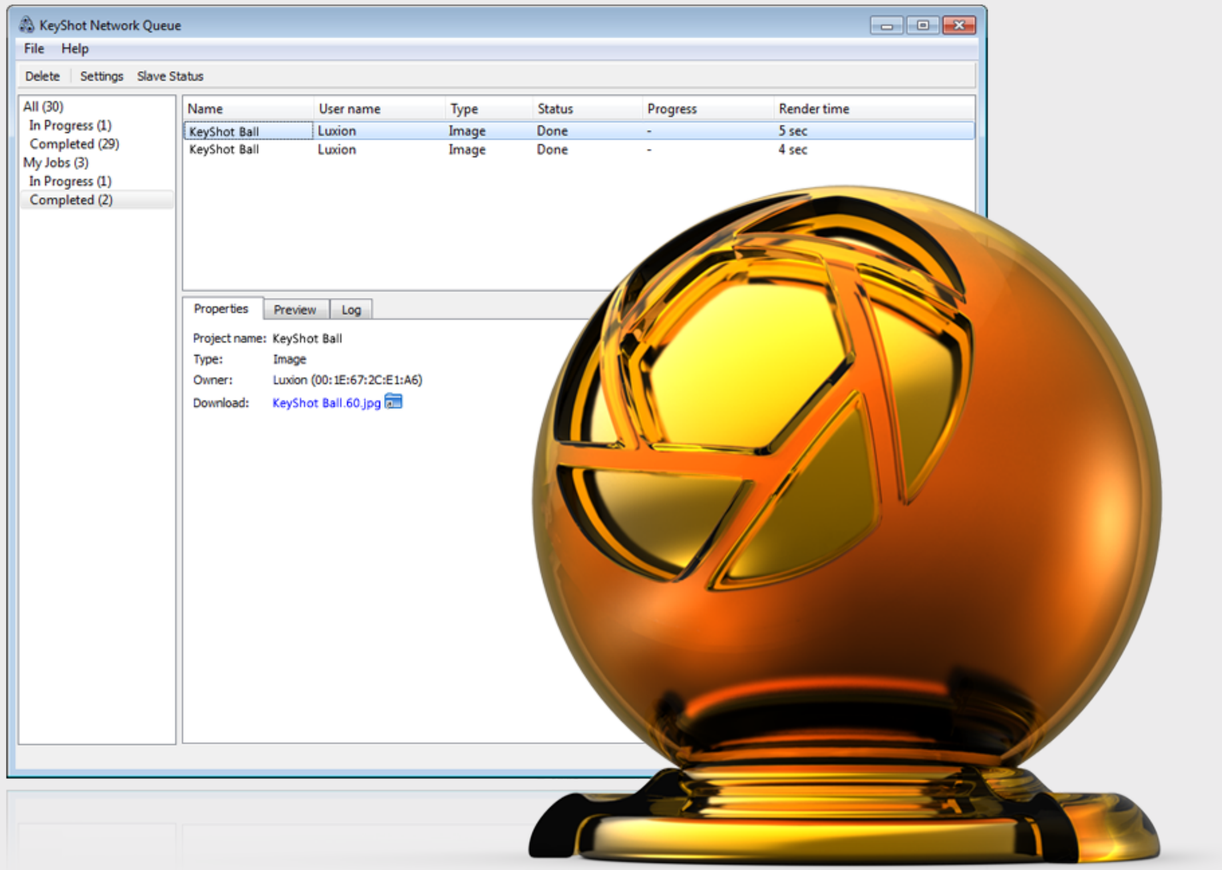
1. Shorten animation lengths to reduce number of frames
2. Reduce Frames per Second (FPS)
    1. 10 seconds @ 30 FPS = 300 frames
    2. 10 seconds @ 24 FPS = 240 frames (20% faster)
3. Avoid unnecessary effects like Depth of Field, physical lights, caustics, motion blur, etc to reduce render time
4. Use Preview animation



Network Rendering

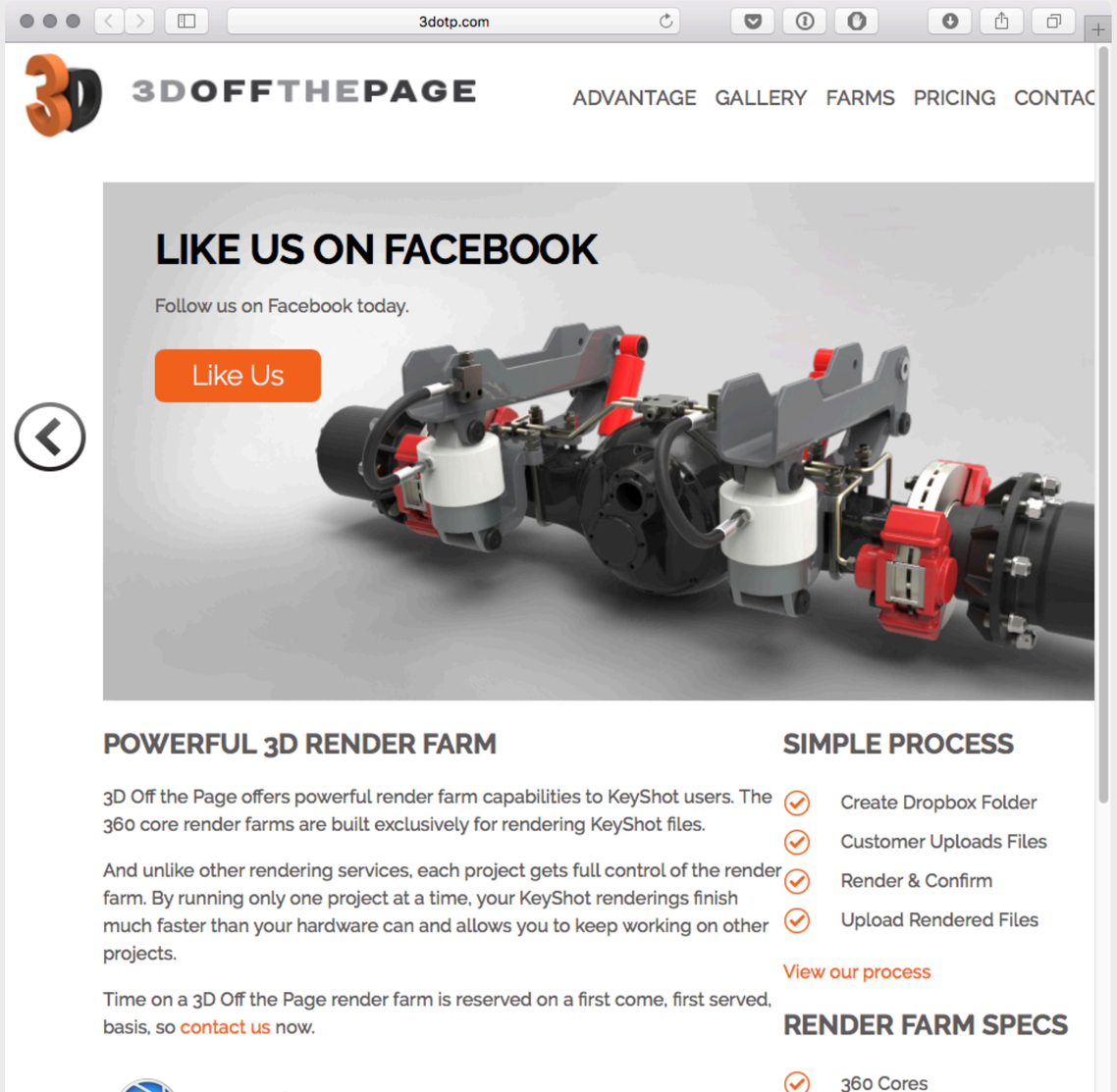
- Tie multiple machines together to create, local render farm
- Separate license sold in 32 core increments
  - $480/year for 32 cores
  - $960/year for 62 cores
  - $1920/year for 128 cores
- Uses your hardware, not cloud based
- For more info:
  - http://www.keyshot.com/features/network-rendering/



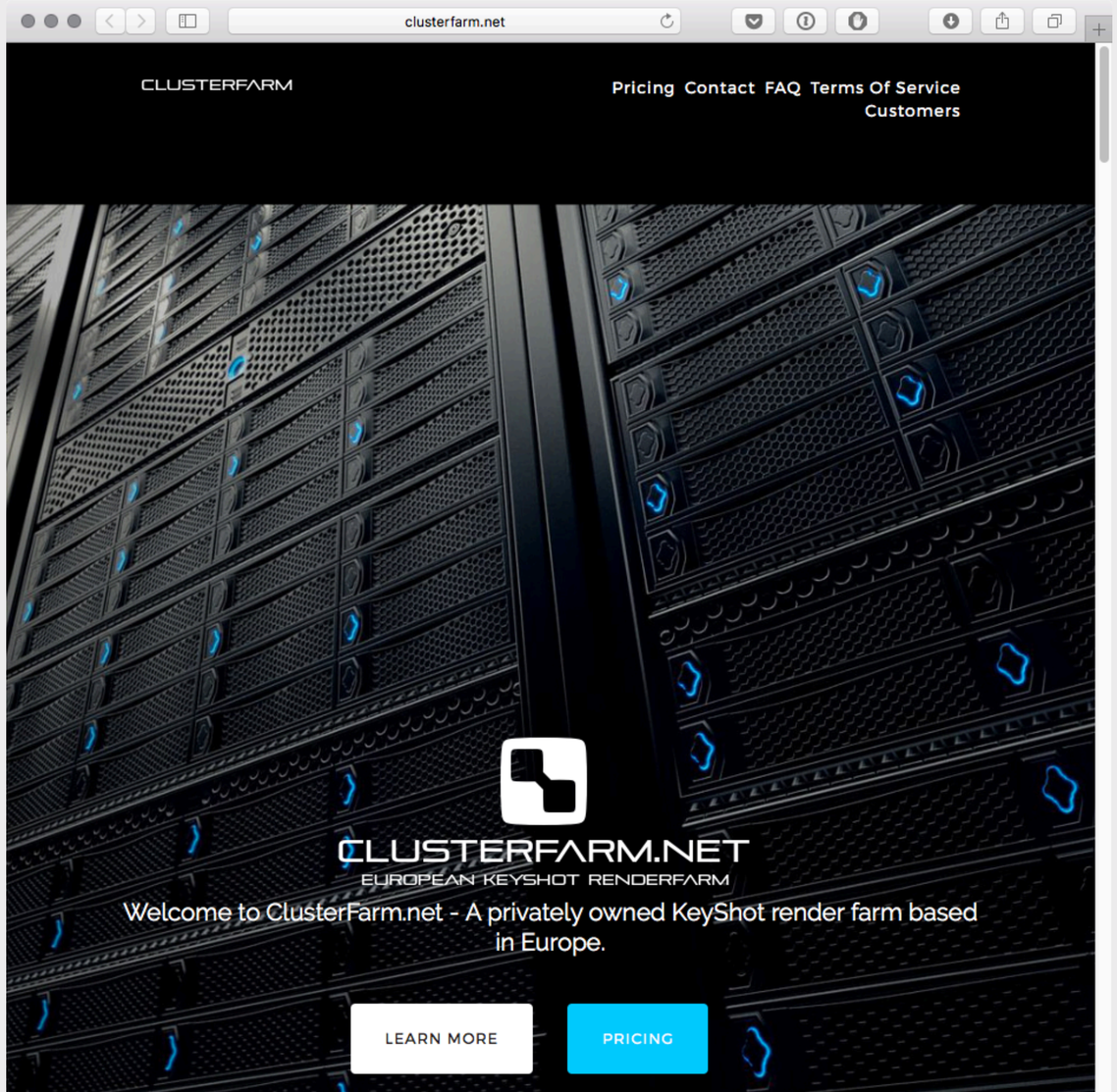


Certified KeyShot Rendering Services

www.3dotp.com



www.clusterfarm.net



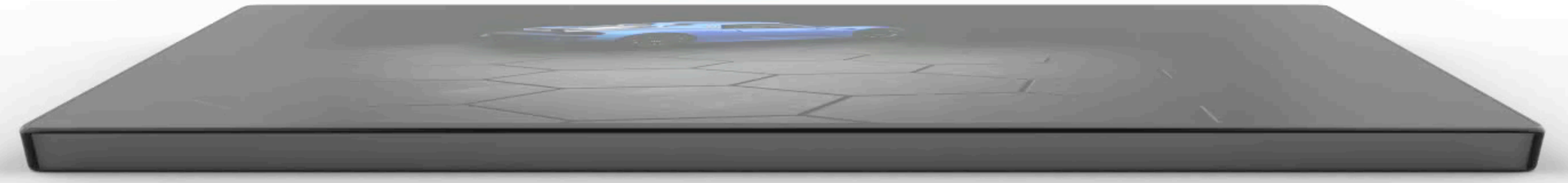
What about deformations, particles, rigged animations, liquids, etc?

Animation by LM6

Complex Animations Supported

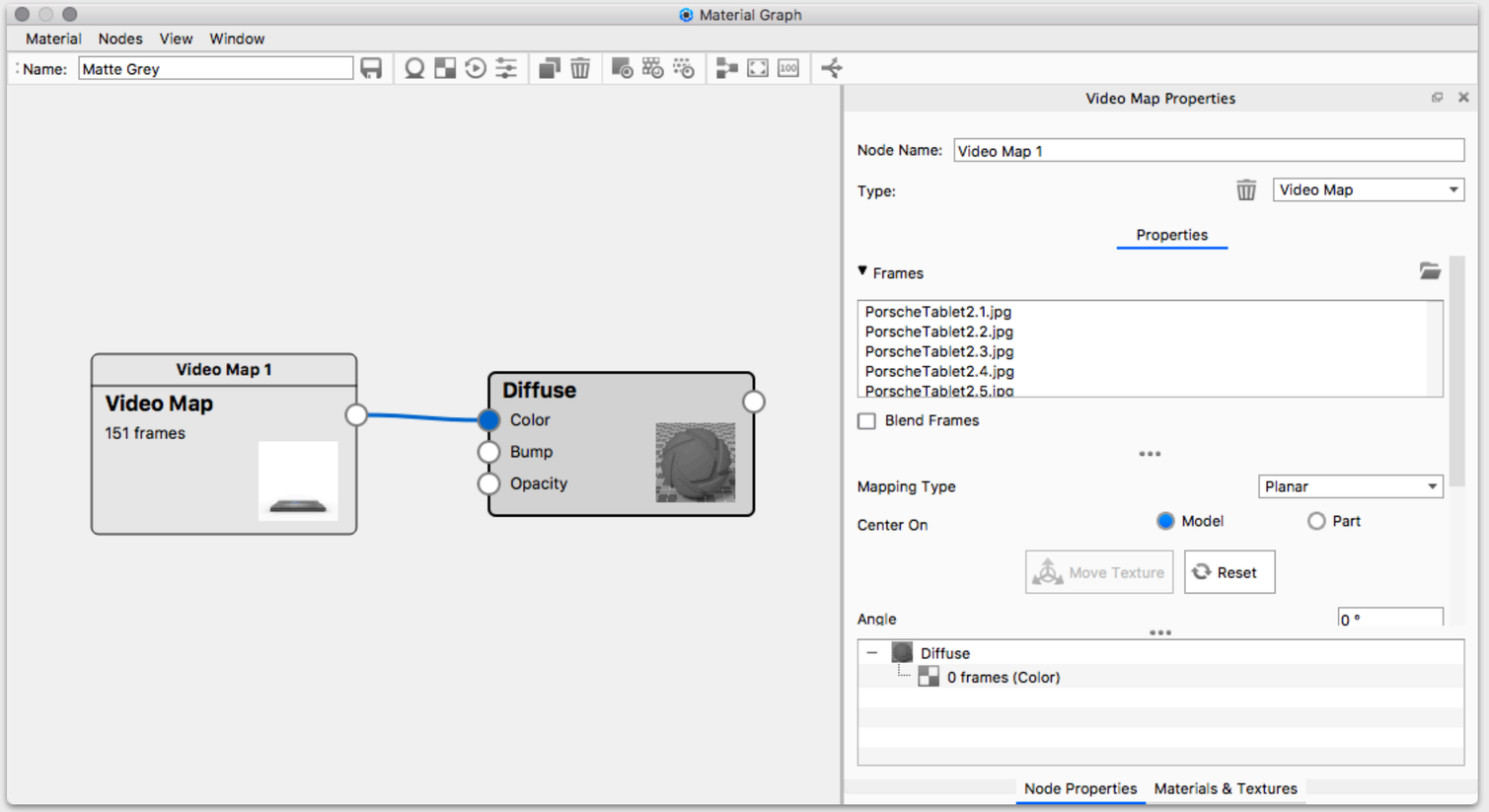
- Animations are also supported with free plugins for:
  - 3ds Max (part and camera animations; rigged and deformable)
  - Cinema 4D (part and camera animations)
  - Maya
  - Solid Edge (part and camera animations)
  - Creo (mechanisms)
- FBX/.abc animations supported via scripting in KeyShot 6
- FBX and Alembic playback will be native in KeyShot 7

KeyShot 7 Animations



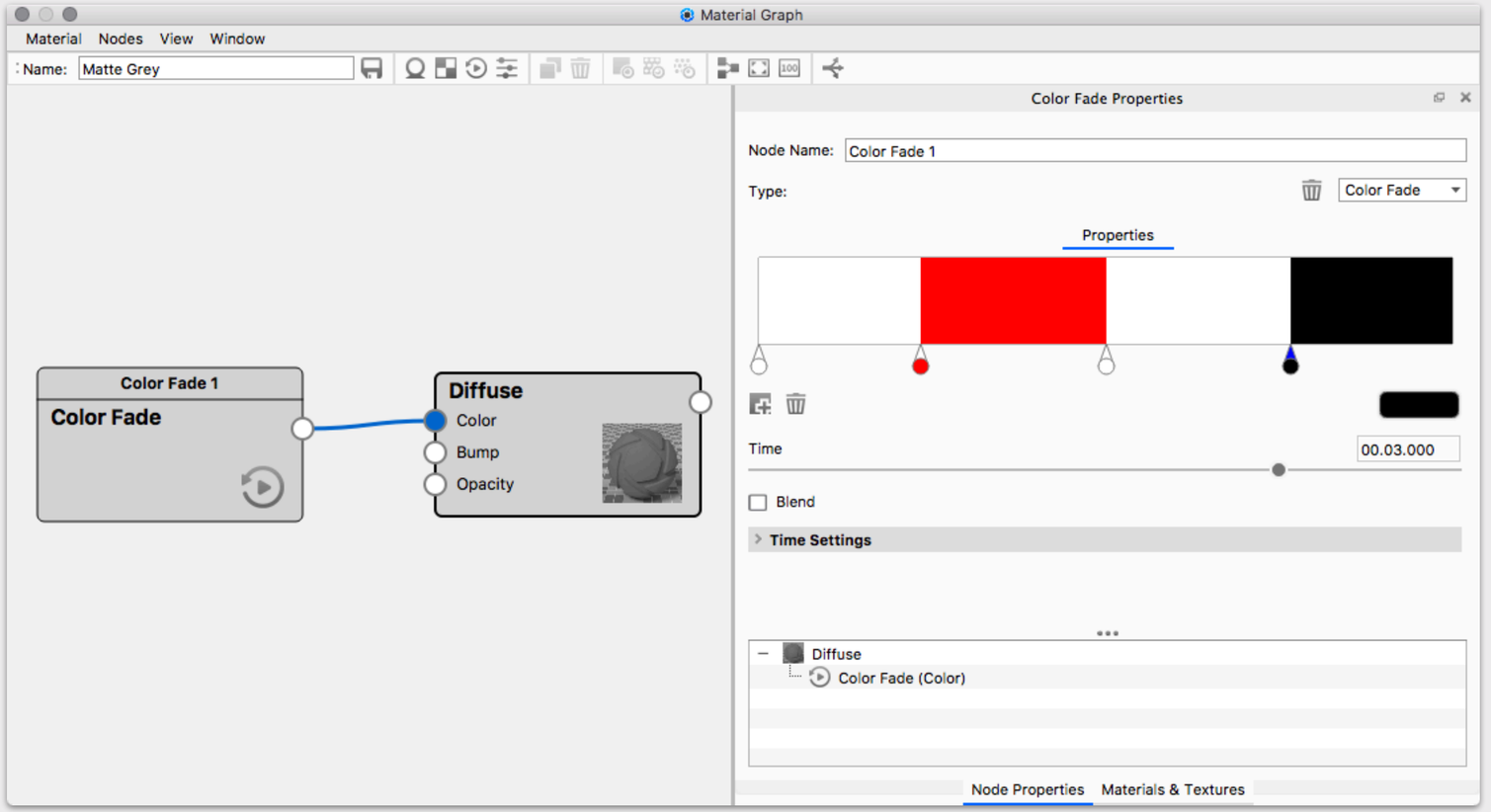
Video Maps

- Image sequences or video files as textures
- Supported formats: avi, mp4, mpeg, flv, webm, dv, f4v, mov, mlv, m4v, hevc, ogg, and ogv



Color Fade

- **Disable blending**
- **Good for flashing colors or values**



Hands On

Q&A