

***TouchDesigner Workshop: realtime visuals for performance  
beginner's level: 31jan-1feb 2018  
intermediate level: 2feb 2018***

**10.00 - 18.00**

**Focus on sound reactive visuals and case studies of my work.**

***TouchDesigner interface basics:***

**<https://www.derivative.ca/Education/BestWorkshopVideos088/>**

***Day1 (beginners) morning***

***Case study***

***"Inferometer" music by Nikolay Popov***

**<https://vimeo.com/199131963>**

***Animating an image with audio***

**d1\_ex1: analysing audio peaks - analyse CHOP - lag CHOP - moviein TOP - composite TOP**

**compare pre and post lag values - trail CHOP - switch CHOP**

**noise function to animate - noise CHOP - time slice**

**d1\_ex2: distort an image with audio reactive noise - noise TOP - displace TOP - speed CHOP**

**d1\_ex3: audio animated ripple - ramp TOP - opacity TOP - speed CHOP - collapsing nodes into a patch**

***Converting audio to image***

**d1\_ex4: 2 methods for converting audio to image - chopto TOP - audiospectrum CHOP - displace TOP**

***Day1 (beginners) afternoon***

***component COMP - Panels***

**in nodes - interface design - perform mode**

***optimization***

**Perform CHOP - FPS - GPU usage**

**Performance monitor**

***3d rendering - Noisy sphere in a box - light projections***

**d1\_ex5: sphere SOP - noise SOP - facet SOP - normals**

**lights - shadows**

**Phong MAT - color - rim lighting**

**texture mapping - texture SOP**

***Converting audio to geometry***

**d1\_ex6: chopto SOP - wireframe MAT**

**-render as tube - limit SOP -render as surface - skin SOP - texture SOP**

***Movies - mixing and layering***

**d1\_ex7: ways of controlling a quicktime movie - scrub**

**mixing - switch TOP**

## *Day2 (beginners) morning*

### **Case study**

"Gore - Russian song" music by Nikolay Popov

<https://vimeo.com/109052990>

### **converting image to geometry**

d2\_ex1: using an image to displace points on a grid - grid SOP - topto CHOP - sopto CHOP - chopto SOP  
point groups - CHOPs

d2\_ex2: particles - collision - force

### **Python scripting and DATs**

d2\_ex3: changing keyframe values in a DAT using chop execute DAT  
CHOPexecute DAT

d2\_ex4: countCOP - text TOP - convert DAT - selecting lines from a text file for output

## *Day2 (beginners) afternoon*

### **pen tool**

d2\_ex5: track mouse movements to create pen tool - panel CHOP

### **geo instancing**

d2\_ex6: record mouse movements and instance geometry - trail CHOP - geometry component:instancing  
add attenuated noise - noise CHOP - pattern CHOP  
GPU vs. CPU - geo instance vs. copy SOP

d2\_ex7: geo vortex sacred geometry

use animated noise to control rotation, ramp to control opacity and colour  
noise CHOP - speed CHOP - ramp TOP - topto CHOP  
GPU transparency in TouchDesigner

### **importing 3d models**

d2\_ex8: demonstration of 3d rigging in houdini - export fbx to TouchDesigner

### **interaction design 1 - leap motion controller**

d2\_ex9: leapmotion TOP - use leapmotion CHOP channels to animate imported rig

### **VR (vive)**

Introduction to VR - stereo render - vive CHOP - what is a camera matrix

### **VIDEO MAPPING**

Kantan mapper comp - drawing masks

Stoner - gridwarp component

CamSchnapper - explanation of projector calibration - camera matrix script

### *Day3 (intermediate) morning:*

#### **case study**

"ANF-93" music by Nikolay Popov

<https://vimeo.com/109052990>

#### **Particles - layering CHOPs**

d2\_ex1: combining noise CHOP and wave CHOP with audiospectrum CHOP

-lookup CHOP - pattern CHOP - explanation of samplerate.

#### **interaction design 2 - kinect2**

d3\_ex1: Paint tool with kinect - skeleton viz patch

#### **case study**

"playing with fire" - interactive installation - particle attractor and kinect

<https://vimeo.com/70735873>

d3\_ex2: particle attractors tracked to hands - kinect world space/screen space - point SOP-particle SOP

d3\_ex3: GLSL shaders – rendering kinect rgb point cloud input

#### **Audio landscape**

d3\_ex4: audio trail in TOPs – convert to CHOPs then to SOPs as a grid

d3\_ex5: same process in CHOPs (more precise) - 'audio history' – trail CHOP-shuffle CHOP, chopto SOP  
line SOP, skin SOP

#### **GLSL shaders 1**

importing shadertoy GLSL shaders to TouchDesigner

<https://www.shadertoy.com>

#### **GLSL shaders 2**

Displacement mapping - creating normals

#### **GLSL shaders 3**

#### **Geometry shaders**

### *Day3 (intermediate) afternoon*

Case Study: "ANF-93" music by Nikolay Popov

<https://vimeo.com/109052990>

d3\_ex6: we use the audio spectrum as vertical emission velocity for particles - particle SOP

#### **Advanced rendering - PBR (physically based rendering)**

d3\_ex7: environment light, metallic surfaces, soft reflections - substance shader: shader builder

d3\_ex8: drag and drop a movie file into a component: container-drag tab

#### **Geometry (SOP) and rendering tricks**

d4\_ex1: tiled wall - fake normals - environment maps-point SOP-primitive SOP

d4\_ex2: explode geometry - primitive SOP

D2\_ex5: ray SOP - creep SOP - animating a light over complex geometry

D2\_ex6: creep SOP - sweep SOP - fitting particles to a path

#### **case study**

"Digital Lighthouse Project" - laser scan for video mapping

<https://vimeo.com/108393131>

#### **VR - vive:**

Case study: "Crusades" - electropark festival

<https://vimeo.com/250304156>

#### **Stereo compositing - clones**

Vive CHOP - Renderpick DAT

Vive template - palate

## **REFERENCES**

*python scripting*

[https://www.derivative.ca/wiki088/index.php?title=Working\\_with\\_OPs\\_in\\_Python](https://www.derivative.ca/wiki088/index.php?title=Working_with_OPs_in_Python)

**TUTORIALS**

<http://matthewragan.com/category/how-to/touchdesigner/>

<http://matthewragan.com/2014/03/05/touchdesigner-these-are-the-dats-youve-been-looking-for/>

<http://matthewragan.com/2014/03/06/touchdesigner-replicators-and-buttons-and-tables-oh-my/>