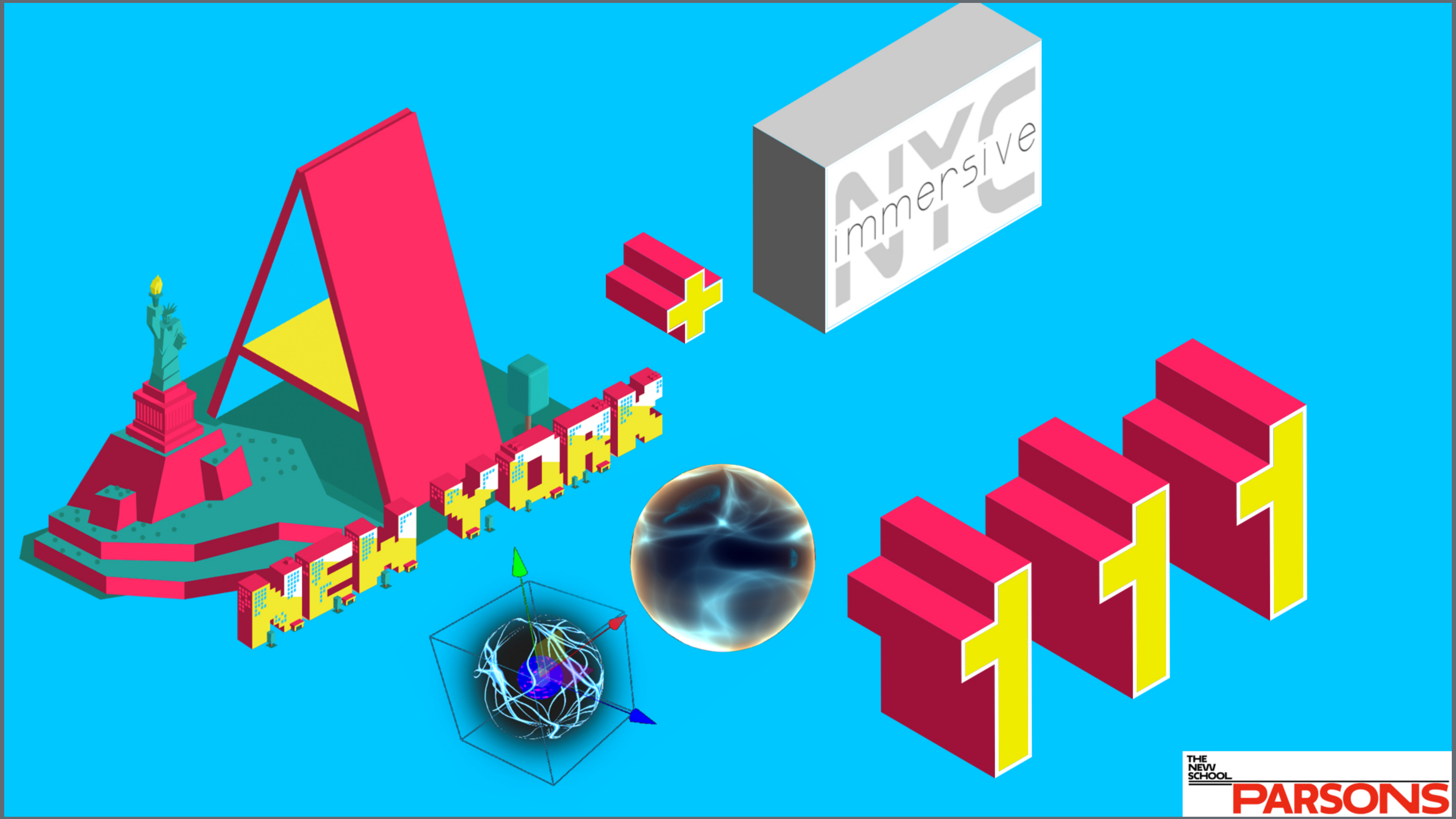
Welcome to A-Frame NYC



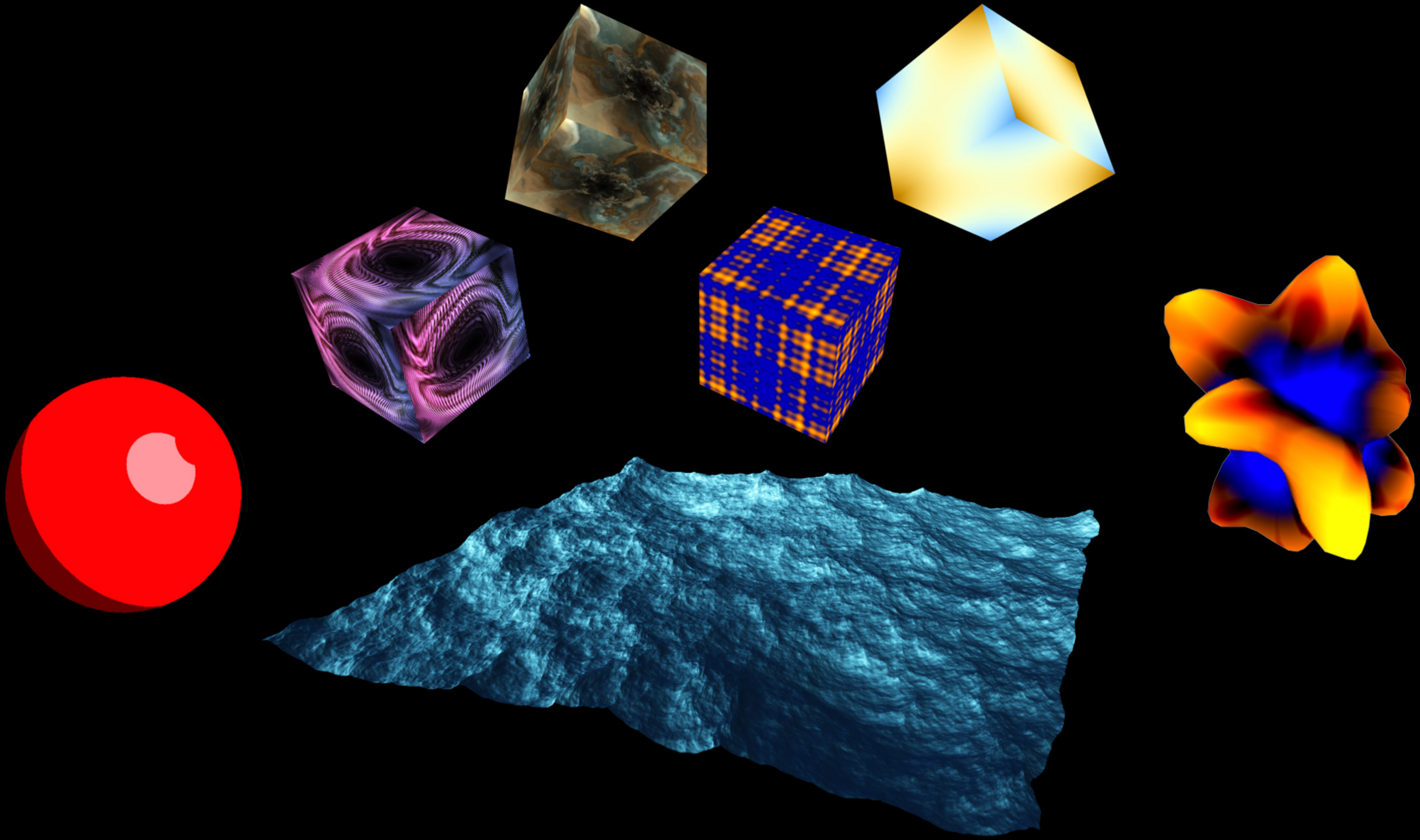
Agenda

- Show & Tell (30 minutes total)
  - Brian Chirls from Datavized presents the 'A-Frame Ambisonic Audio Component' with their Airfield audio editor.
  - Members talk about their progress on "A-Robots"
- Presentation (20 minutes)
  - A glance at Shaders: Tinkering with ShaderFrog
- Formation of workshop groups (10 minutes)
- Workshop (60 minutes)

Shawn: https://maddening-smash.glitch.me/

A glance at Shaders

Tinkering with ShaderFrog



Syntax: Shader Component

```
AFRAME.registerShader('my-custom', {
  schema: {
    // ...
  },
  raw: false,
  vertexShader: vertexShader,
  fragmentShader: fragmentShader
});

<a-box material="shader: my-custom;"></a-box>
```

What is a Shader?

A shader is essentially a function required to draw something on the screen. Shaders run on a GPU (graphics processing unit), which is optimized for such operations. Using a GPU to deal with shaders offloads some of the number crunching from the CPU. This allows the CPU to focus its processing power on other tasks, like executing code.

With Shaders you are able to write your own lighting model. But that's only one feature of shaders. There are thousands of other really nice possibilities: Shadows, Environment Mapping, Per-Pixel Lighting, Bump Mapping, Parallax Bump Mapping, HDR, and much more!

There are two types of shaders in GLSL: vertex shaders and fragment shaders.

Shader Type: Vertex Shader

Vertex shaders manipulate coordinates in a 3D space and are called

Shader Type: Vertex Shader

- Vertex Transformation
- Normal Transformation, Normalization and Rescaling
- Lighting
- Texture Coordinate Generation and Transformation

Shader Type: Fragment Shader

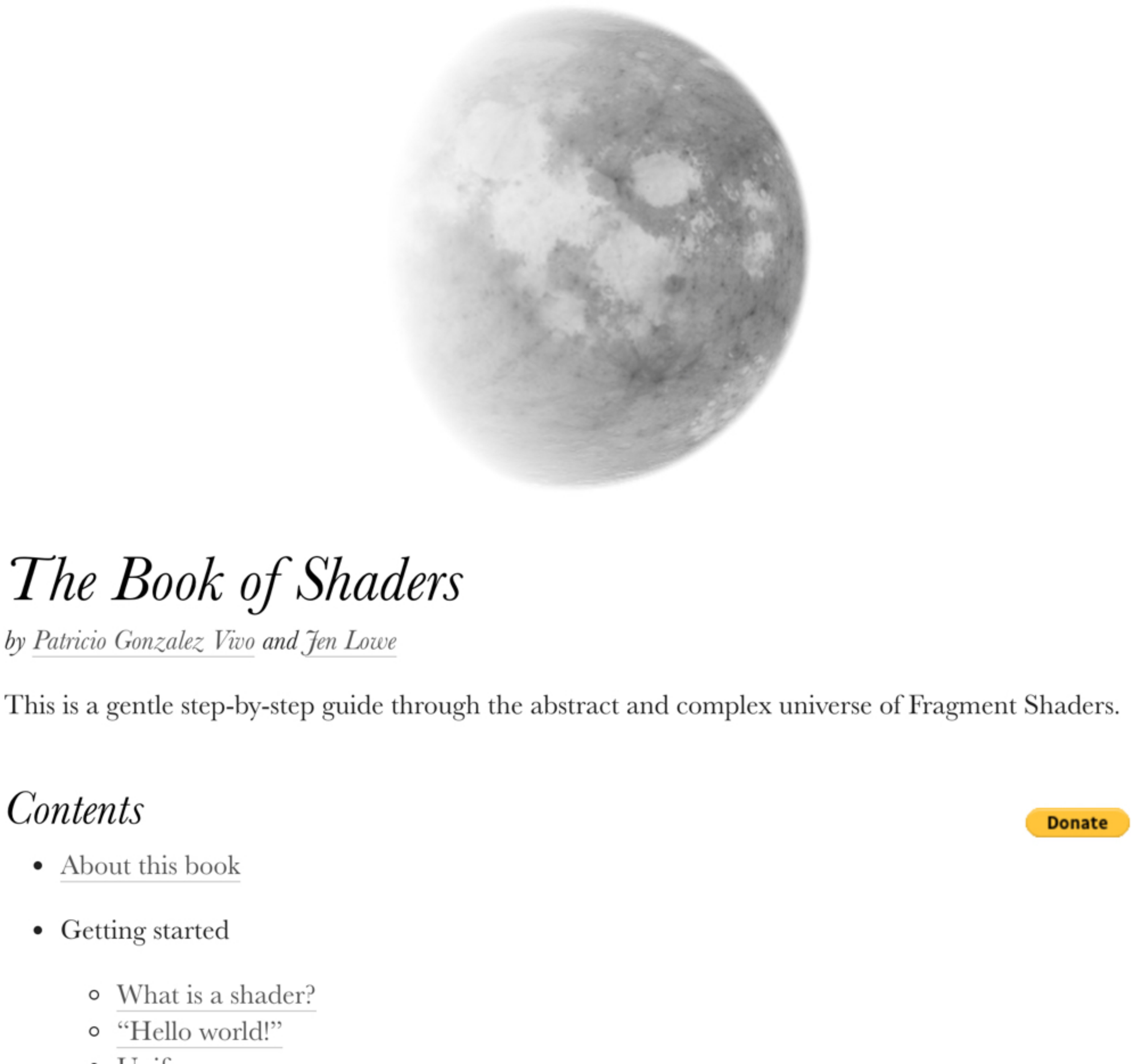
Fragment (or texture) shaders define RGBA (red, blue, green, alpha) colors for each pixel being processed — a single fragment shader is called once per pixel. The purpose of the fragment shader is to set up the `gl_FragColor` variable. `gl_FragColor` is a built-in GLSL variable like `gl_Position`.

The calculations result in a variable containing the information about the RGBA color.

Shader Type: Fragment Shader

- Texture access and application (Texture environments)
- Fog

https://thebookofshaders.com/



The Book of Shaders

by Patricio Gonzalez Vivo and Jen Lowe

This is a gentle step-by-step guide through the abstract and complex universe of Fragment Shaders.

Contents

AFrame/ThreeJS Shader Tools

Shaders demo - Shaders edit

Components:

aframe-import-shaderfrog

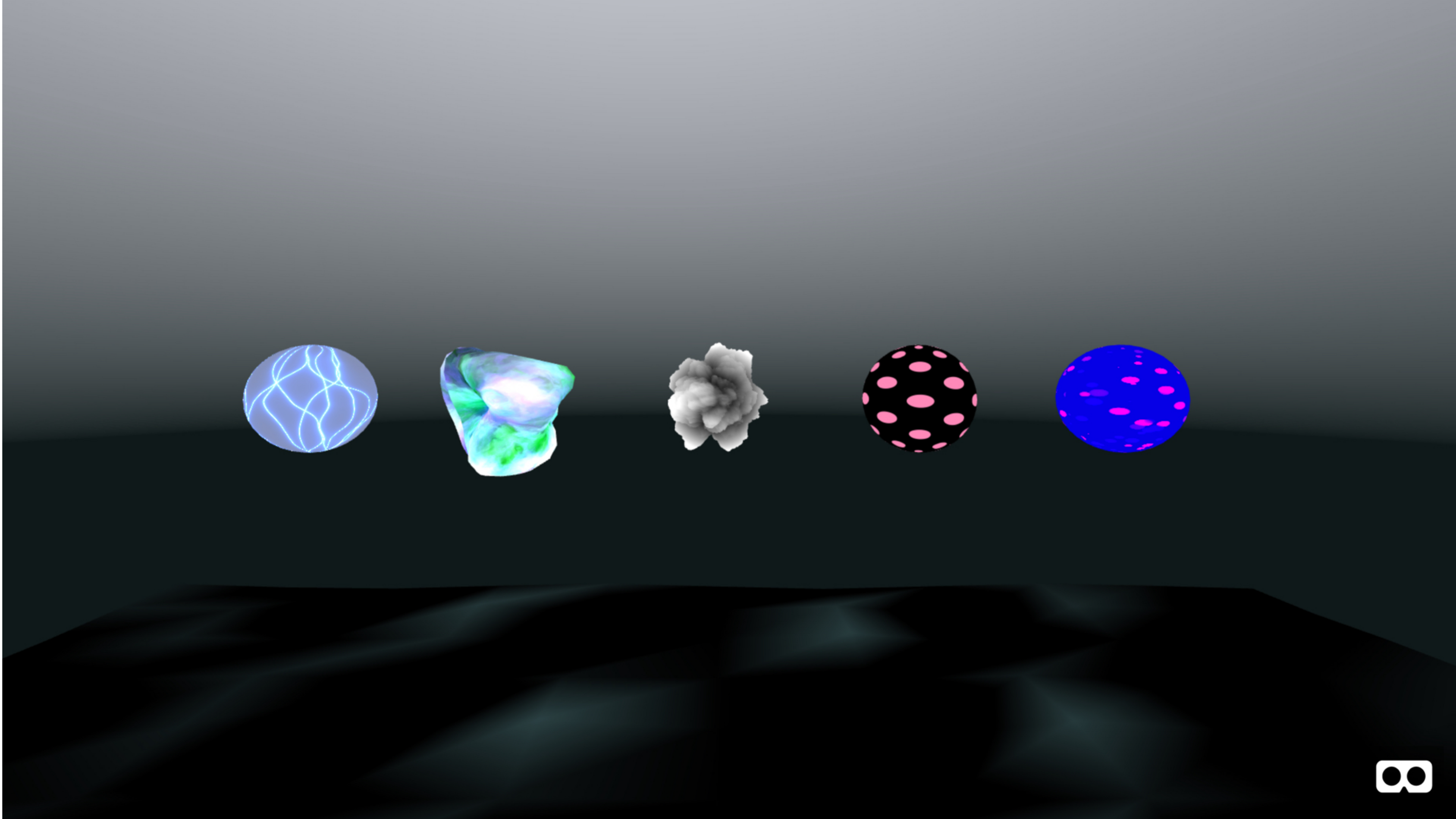
aframeFrogShaders

CS1 Game Engine for making 3D multiplayer games in JavaScript by Eric Eisaman

Resources:

https://shaderfrog.com/

https://shadertoy.com/



Take Home Project - Step 4

- Create one custom shader
- Apply the shader to one part of your robot
- Show/hide the shader by triggering a custom key/trigger

Tip: Use the shader to visualize engine thrusters, magic powers or emotional cues

Character design 2012-09-18

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Discussion & Feedback

- **Members, bring your friends!** We need to grow our active members.
- **Take projects home** and send them in for feedback, we love to collaborate and help you learn. **Share** your projects and get important feedback.
- Catch up on older lectures: github.com/roland-dubois/aframe-meetup-nyc & Suggest topics to cover

@rolanddubois @debraeanderson