

06.04.2016

Shader in MITK

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dkfz.

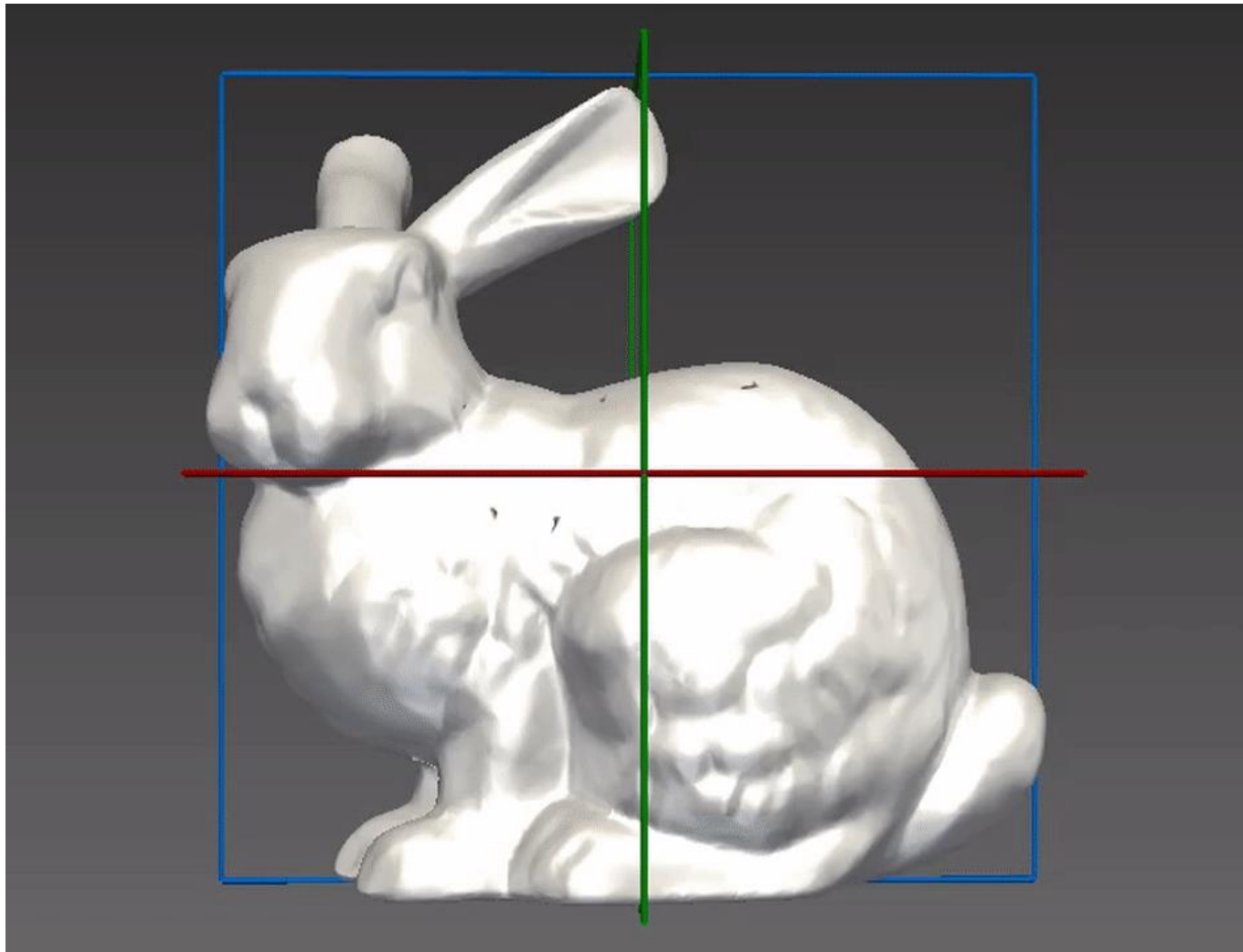
GERMAN
CANCER RESEARCH CENTER
IN THE HELMHOLTZ ASSOCIATION



50 Years – Research for
A Life Without Cancer

Shader

- Vertex shader
 - Changes the position of a vertex
- Fragment shader / Pixel shader
 - Determines the color of a pixel
 - Uses lighting, material, normals...



Shader Program

Vertex shader

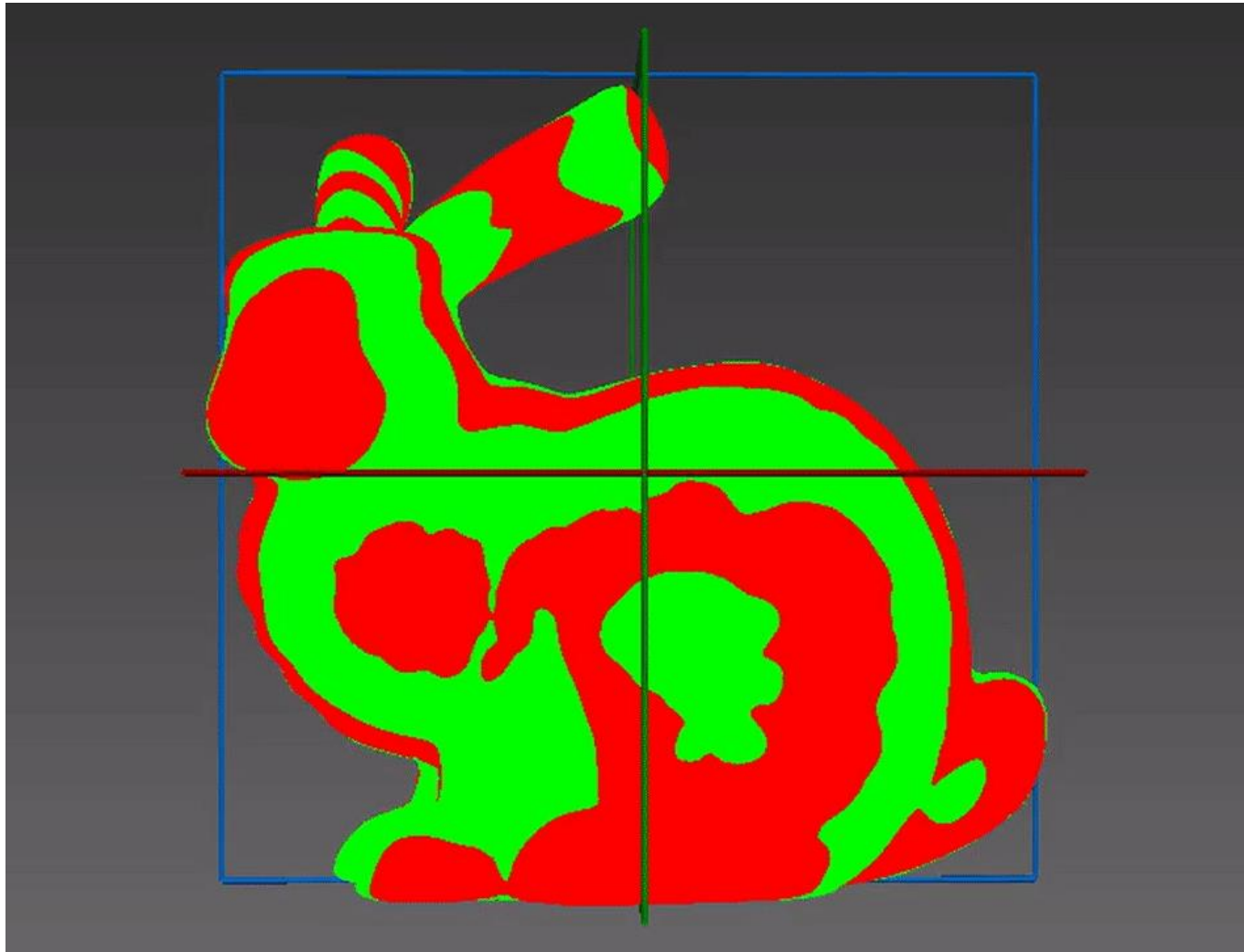
```
varying float dist;

void main(void)
{
    vec4 cs_position =
        gl_ModelViewMatrix * gl_Vertex;
    dist = -cs_position.z;
    gl_Position = ftransform();
}
```

Fragment shader

```
varying float dist;

void main(void)
{
    int stripe = dist/5;
    if(stripe%2 == 0)
        gl_FragColor = vec4(1,0,0,1);
    else
        gl_FragColor = vec4(0,1,0,1);
}
```



XML Shader Program for MITK

In:

Modules/VtkShaders/resource/Shaders/mitkFancyShader.xml

```
<Shader scope='Fragment' name='FragmentShader' location='Inline'
```

```
  language='GLSL' entry='main'>
```

```
    uniform vec4 slicingPlane;
```

```
    uniform float sliceThickness;
```

```
    varying vec3 positionWorld;
```

```
  void main(void)
```

```
  {
```

```
    ...
```

```
  }
```

```
<Uniform type="vec4" name="slicingPlane" number_of_elements="4" > </Uniform>
```

```
<Uniform type="float" name="sliceThickness" number_of_elements="1" > </Uniform>
```

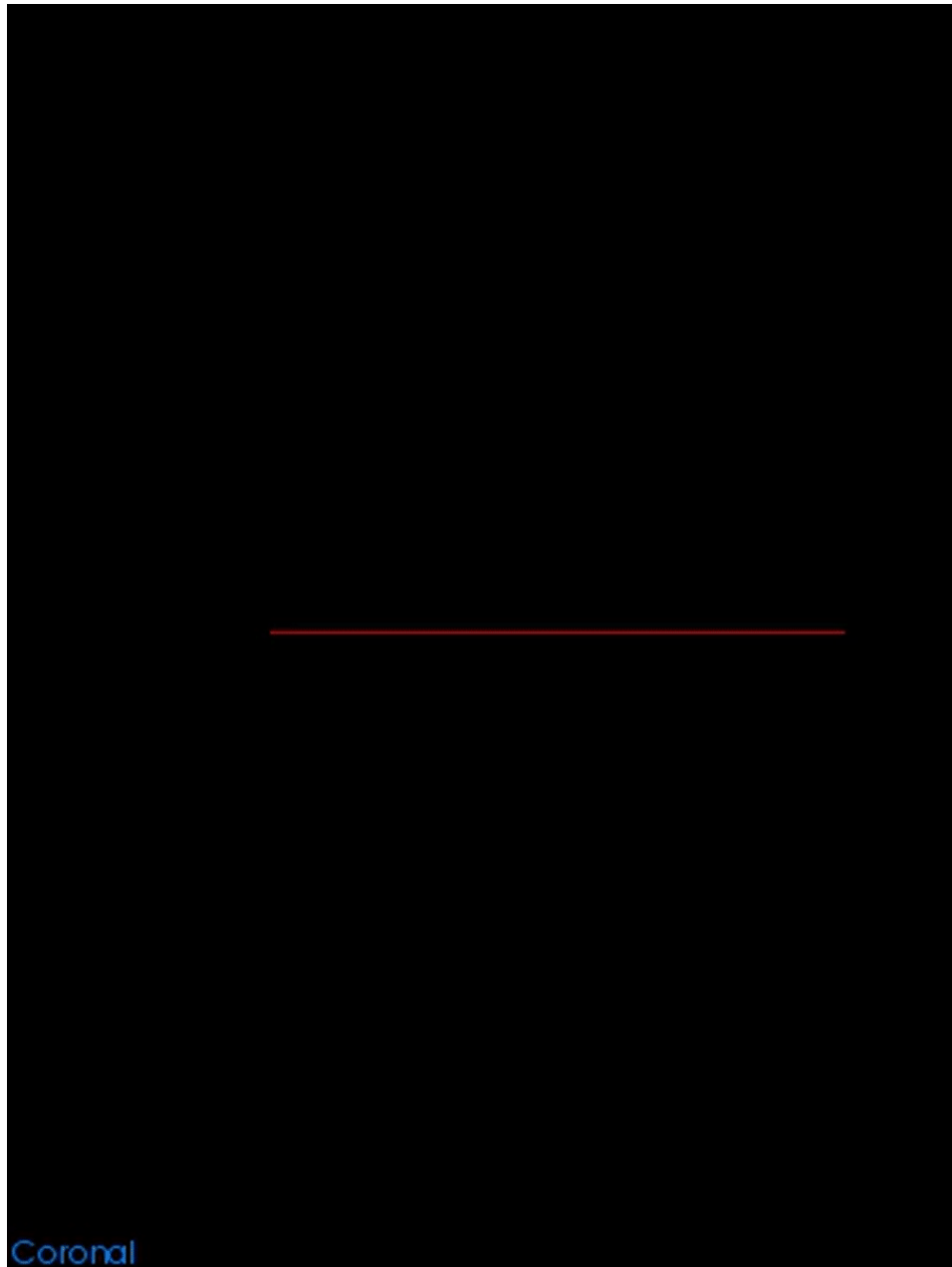
```
</Shader>
```

```
</Material>
```

Shader Variables in MITK Mapper

```
node->SetFloatProperty("shader.mitkFancyShader.slicingPlane.w",plane1[3],renderer);
node->SetFloatProperty("shader.mitkFancyShader.slicingPlane.x",plane1[0],renderer);
node->SetFloatProperty("shader.mitkFancyShader.slicingPlane.y",plane1[1],renderer);
node->SetFloatProperty("shader.mitkFancyShader.slicingPlane.z",plane1[2],renderer);
node->SetFloatProperty("shader.mitkFancyShader.sliceThickness",thickness);

void mitk::SurfaceVtkMapper3D::GenerateDataForRenderer(mitk::BaseRenderer* renderer)
{
    ...
    this->ApplyShaderProperties(renderer);
}
```



Coronal

A photograph of the German Cancer Research Center (DKFZ) building, a modern multi-story structure with a central glass tower and balconies. In the foreground is a paved courtyard with several water fountains and orange benches. The sky is blue with some clouds.

Thank you
for your attention!

Further information on www.dkfz.de

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