Virtual Reality & 360 Rendering

Instructor: Wobbe F. Koning
360º Video

- Pre-rendered
  - Shot with multiple cameras and stitched together
  - CGI
- Can be Stereoscopic
  - Really hard to shoot properly
- Needs to be Hi Res
  - 4K and up
Lat Long (equirectangular) Image

- Panorama image format
Lat Long (equirectangular) Image

- "Help," directed by Justin Lin, VFX: The Mill
  - Google Spotlight Stories platform.
Lat Long Conversion

- Only part of full 360 video is viewed full screen
- Original needs to be extremely Hi-Res: 4K or 8K
Virtual Reality (VR) vs. 360° Video

**VR**
- Real Time rendered
- Stereoscopic
- Full Head Tracking
  - Can include movement
- Controllers add more interactivity.
- Both can be experienced through a Head Mounted Display (HMD)
  - Can be combined :)

**360° Video**
- Prerecorded / Rendered
- Can be Stereoscopic
- Head Tracking
  - Rotation only
    - look around
- Linear / Non-Interactive

Both can be experienced through a Head Mounted Display (HMD)

Can be combined :)
Rendering 360° Stereoscopic CGI

- Arnold 5 has a camera for that.
  - Image: solid angle
Mixing VR & 360° Video

- Pre-rendered footage has fixed camera position
  - Moving HMD does not change perspective
- Real time rendered object support full parallax

- Scale
  - Maya default unit = 1 centimeter
  - Unity default unit = 1 meter
Placing you Camera

- Camera should be placed at eye level
  - Rotation X and Z should be 0 (zero)

- Average height of U.S. Adults (age 20+, Wikipedia)
  - 175.7 cm (5 ft 9 in) for men
  - 161.8 cm (5 ft 3 1⁄2 in) for women

- Image right: Eye levels
  - Irish National Disability Authority
How big is my scene?

- Maya Units by default set to centimeter
Use Reference to Estimate Scale

- Andy, for instance
  - Andy Rig by John Doublestein
Use reference to Place Camera

- Place Camera at Eye Level
Render 360 View Without "Platform"

- Object that are to be real time rendered in Unity are NOT included in Render
- Set Eye Separation to match scale of scene
World as Viewed from Tower
Playing 360 video in Unity

- Create a SkyBox Material
- Set this as Environment
  - Window > Lighting > Settings
- Create a Render Texture
  - Select it as input for the material
Put your video in your scene

- Set to Render Texture with SkyBoxTexture as target
Getting "Platform" to Unity

- Export "Platform" (in this case, the Tower)
  - as Maya Binary
  - You can include reference object
Open Exported Scene

- Set Working Units to Meter
  - Windows > Settings Preferences > Settings
Scale Object to Match Working Units

- You may use measure tool, or create reference cube
  - Reference object helps
Freeze Scale, Place

- On the object you want to be rendered in real time
- Camera in Unity is placed at Origin
- Move object so the origin is exactly where you would be standing to view world as rendered
Export as FBX
Export as FBX

File Type Specific Options

- Export Selection
  - Include settings not crucial

- Units: Scale Factor 1.0
  - When using mm as unit, this should be 100

- Axis Conversion - Up Axis: Y
Open the Unity Project

![Unity Project Interface](image-url)

- **TestAgain**
  - Path: M:\2018_Spring\Vive_VR | Unity version: 2017.3.1

- **VRinteractTest**
  - Path: G:\Projects\Unity | Unity version: 2017.3.1

- **ViveTest**
  - Path: M:\2018_Spring\Vive_VR | Unity version: 2017.3.1 | w-f-koning

- **VRtest**
  - Path: M:\2018_Spring\Vive_VR | Unity version: 2017.3.1 | w-f-koning
Import the FBX file

- Assets > Import New Asset
- OR
- Export directly to Unity project’s Asset folder
Unity Scene with Tower

- Cube added as extra check
- Scale 1x1x1 Units > Meter Cube
  - Game Object > 3D Object > Cube

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In Unity: Scale is set to 0.01!

- Exported correctly, comes in at correct size
- Legacy setting - kept for consistency
Textured & World in SkyBox

- SteamVR camera added (SteamVR Package)
- Package also required for stereoscopic SkyBox