VRDC

SyFy Incorporated: Building Realtime Experiences with Plate Photography

Aruna Inversin
CD & VFX Supervisor, Digital Domain

Aruna Inversin

Creative Director & Visual Effects Supervisor
Virtual Reality / Augmented Reality Division
Digital Domain

Over twenty years of VFX

- 45+ feature films
- 20+ commercials
- 15+ virtual reality experiences

@r00nee

DIGITAL DOMAIN

Founded in 1993 by James Cameron

True Lies
Titanic
The Fifth Element
The Curious Case of Benjamin Button
The Fate of the Furious
Beauty and the Beast

@digitaldomaindd

- Evolution of Verse
- The Neymar Jr Effect.
- SyFy : The Expanse – The Canterbury
- SyFy : The Expanse – Tycho Station & The Nauvoo
- VS Media : Li Yu Chun – Open Up Music Video
- SyFy : Incorporated – Welcome to the Quiet Room

And many monoscopic 360 live action projects, streaming and on demand.

Latest project is the NBA VR app for Google Daydream platform, streaming high fidelity stereoscopic interviews with NBA Legends every week.

Lots of upcoming interactive narrative VR experiences this year.

The Neymar Effect

for Nike

Presented as 360° .mp4 VR on Nike app and Youtube

Technical Details:

- One ARRI Alexa (3K) as main camera
- Two Codex ActionCams (HD) as stereo witness cameras
- Three RED Dragons (4K) as set witness cameras
- Two 360° GoPro camera arrays (5.5K) as motion control rig witness camera
- One 360° GoPro camera array (5.5K) as unicorn (head mounted camera)

Recorded at 90 fps (89.91 actual). GoPros and ActionCams at 60fps (59.94 actual)
Two greenscreen stages.
Three day shoot, 80 terabytes of data.
Four month post schedule for 90 seconds of final VR piece.

SPIGA
IN CORP WE TRUST
FROM EXECUTIVE PRODUCERS
BEN AFFLECK AND MATT DAMON
INCORPORATED
SERIES PREMIERE
DECEMBER 1
Syfy

SyFy: Incorporated

"Welcome to the Quiet Room"
First Delivery for SyFy at San Diego Comic-Con on the HTC Vive
Second Delivery for Facebook 360 and YouTube 360

Challenges:

- Creative
- Real-time positional tracking combined with live action, on set capture
- Resources
- Time (one month, production shoot to activation)

The Quiet Room

- Two RED Dragons (6K) as main camera
- One Sony A7s2 (4K) as set witness
- Velodyne HDL-32E laser scanner

Recording at 29.97fps
One day shoot

Final length of content: Three minutes

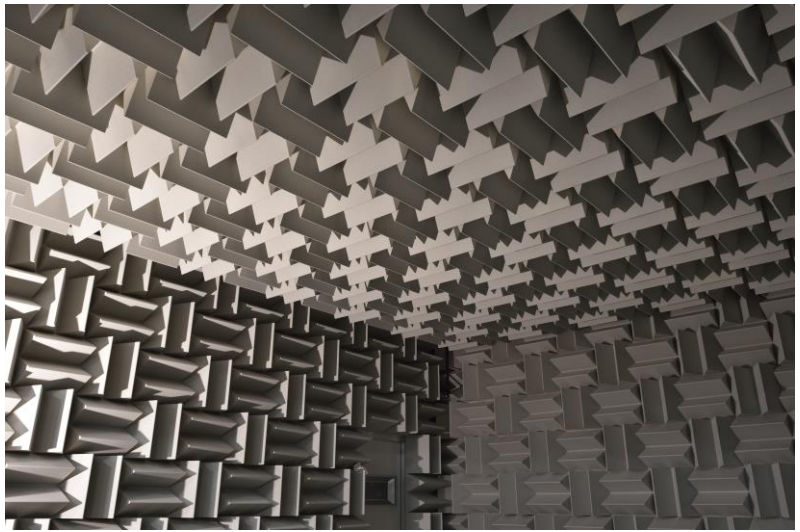
The Quiet Room

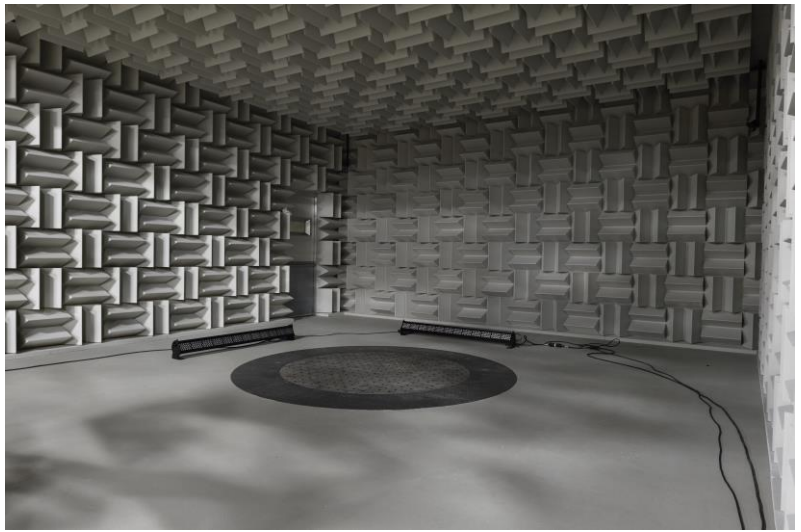
Assets built using our VR / VFX Pipeline

- Substance
- Maya
- Track (internal Digital Domain software)
- Nuke (custom toolsets)
- Agisoft
- RealityCapture

Runtime

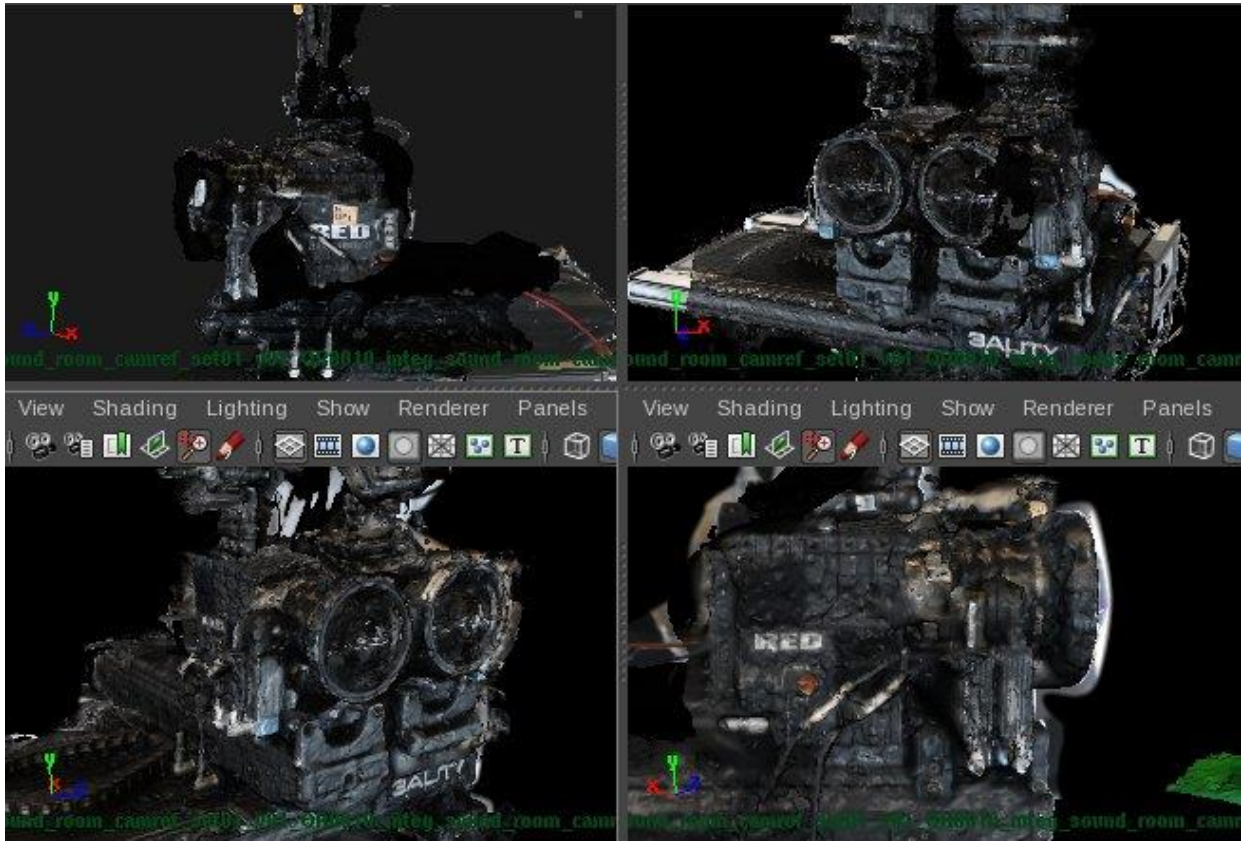
- Unreal

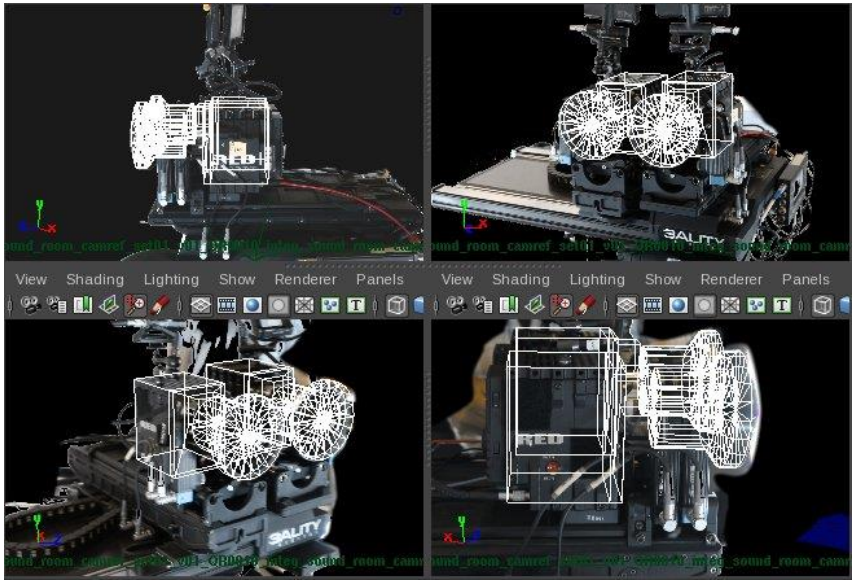




Main Camera Setup

RED Dragon 6K
3ality stereo rig
8mm fisheye lenses
Custom Ubangi mount to tripod
Timecode synced @ 29.97 fps


View Shading Lighting Show Renderer Panels
View Shading Lighting Show Renderer Panels
RED
RED


View Shading Lighting Show Renderer Panels
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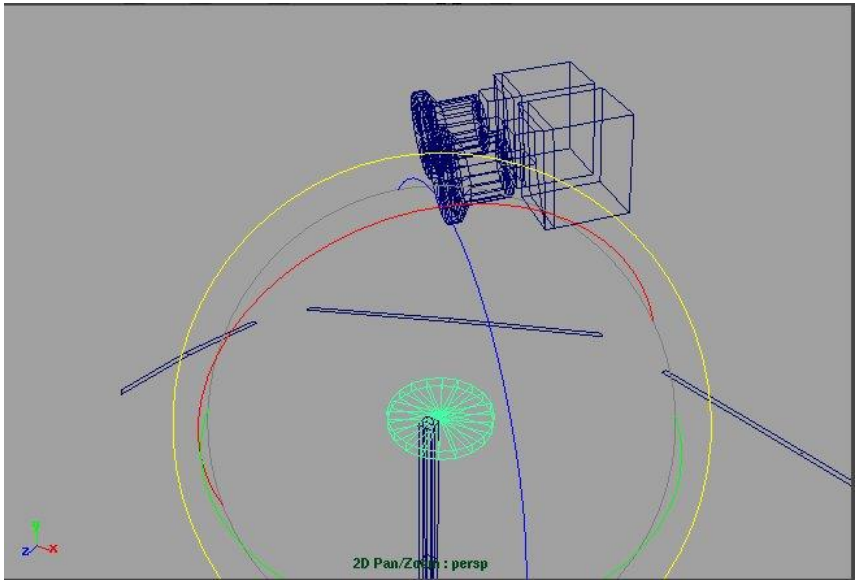
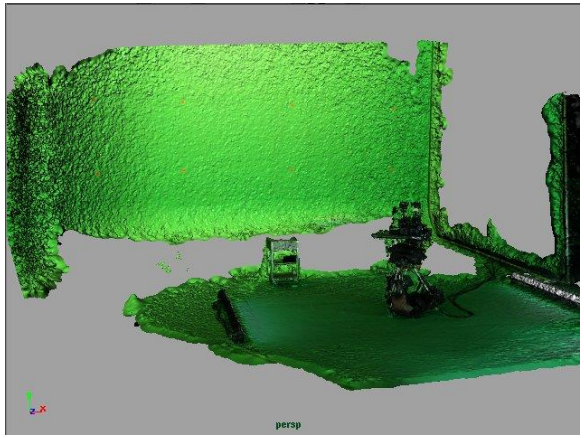

2D Pan/Zoom : persp

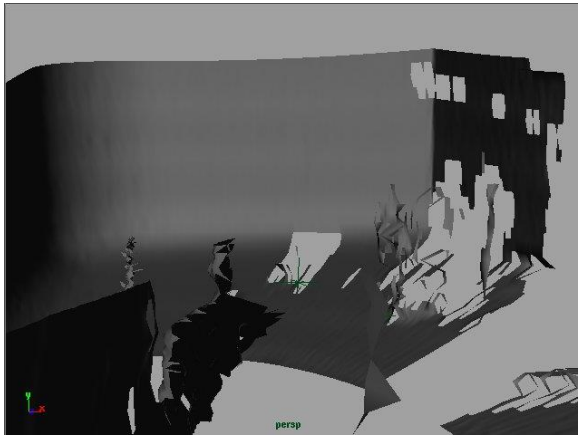
UBISOFT
UBISOFT

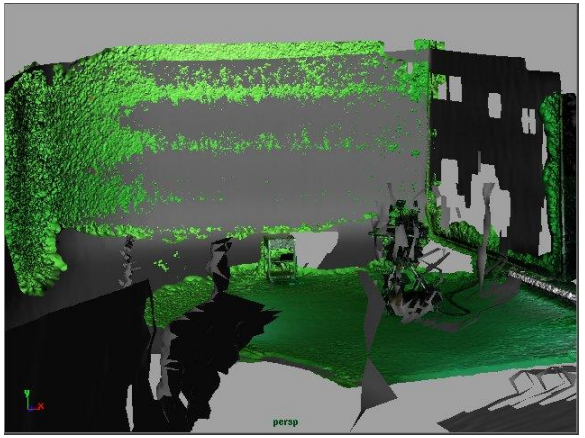
Witness Setup

Velodyne HDL-32E
Spinning at 1200rpm, capturing 700,000 points / second
Synced to A7s2 recording 4K @ 29.97 fps with a
Custom LTC to GPS timecode hardware package

Appropriately covered in green.







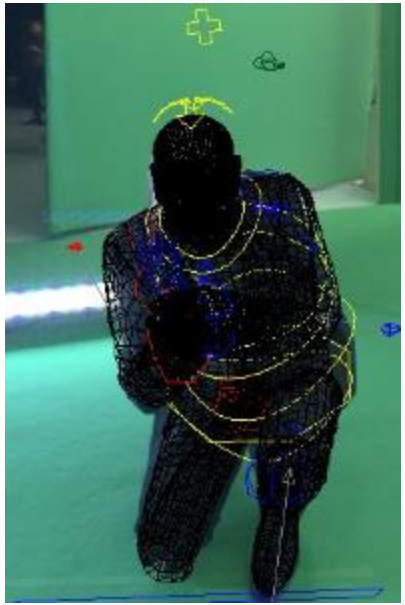
Overlaying photogrammetry and geometry from LIDAR

A single WMV contained

- RGB (bottom)
- Alpha (left)
- Depth (right)
- 2048x2048
- 29.97fps
- Single channel audio
- Three minutes long

Times two (secondary character!)

Rotomation

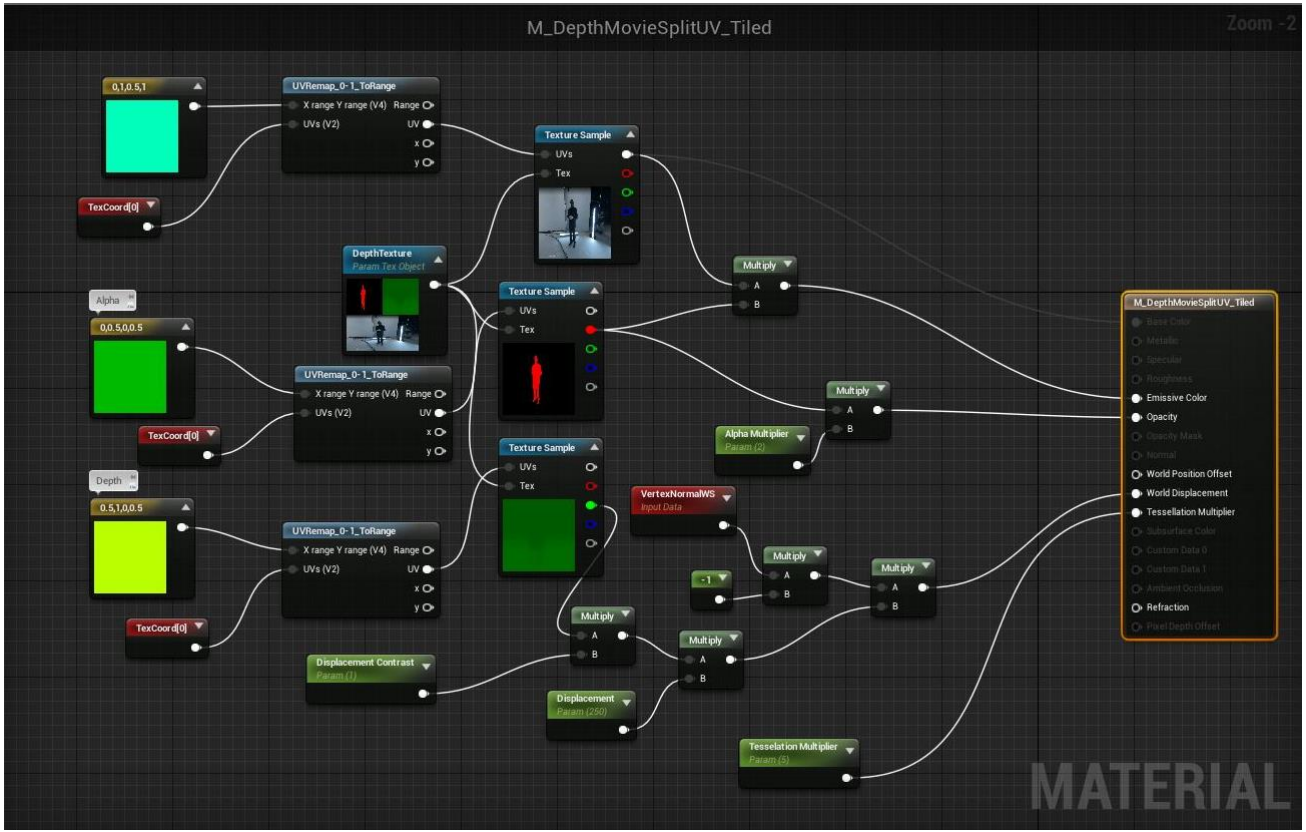


Animated in Maya using point cloud data and stereo as a guide

Simple rigged persons of both main actor (Dennis Haysbert) and secondary character (shown here)

Using both depth from two cameras and this rotomation, we were able to pinpoint exactly where actors were in the live action set

From there, just plug into Unreal, and just run in real-time!


M_DepthMovieSplitUV_Tiled
Zoom -2
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UVRemap_0-1_ToRange
X range Y range (V4)
Range
UVs (V2)
UV
x
y
TexCoord[0]
Texture Sample
UVs
Tex
DepthTexture
Param Tex Object
Alpha
0,0.5,0,0.5
Depth
0.5,1,0,0.5
Multiply
A
B
Alpha Multiplier
Param (2)
VertexNormalWS
Input Data
-1
Displacement Contrast
Param (1)
Displacement
Param (250)
Tesselation Multiplier
Param (3)
M_DepthMovieSplitUV_Tiled
Base Color
Metallic
Specular
Roughness
Emissive Color
Opacity
Opacity Mask
Normal
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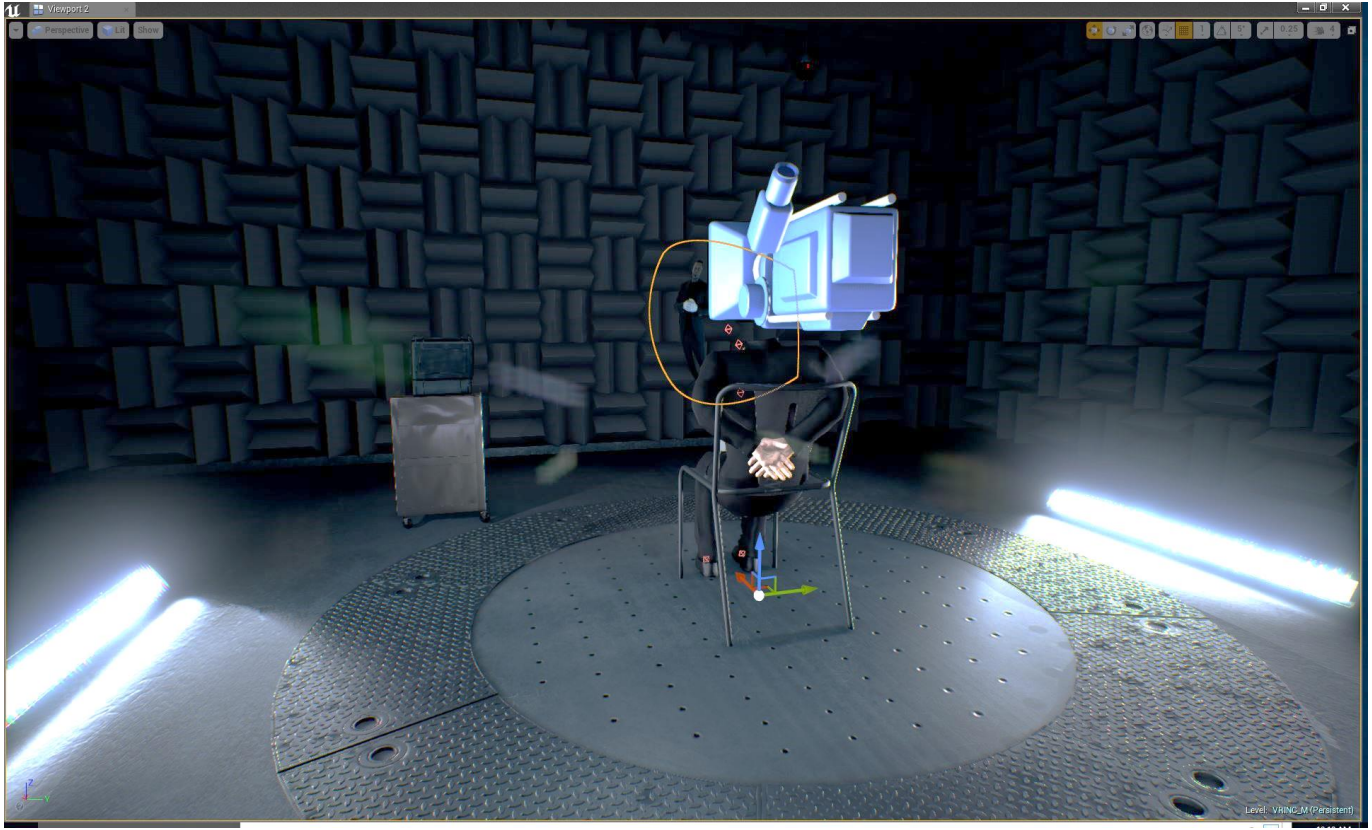
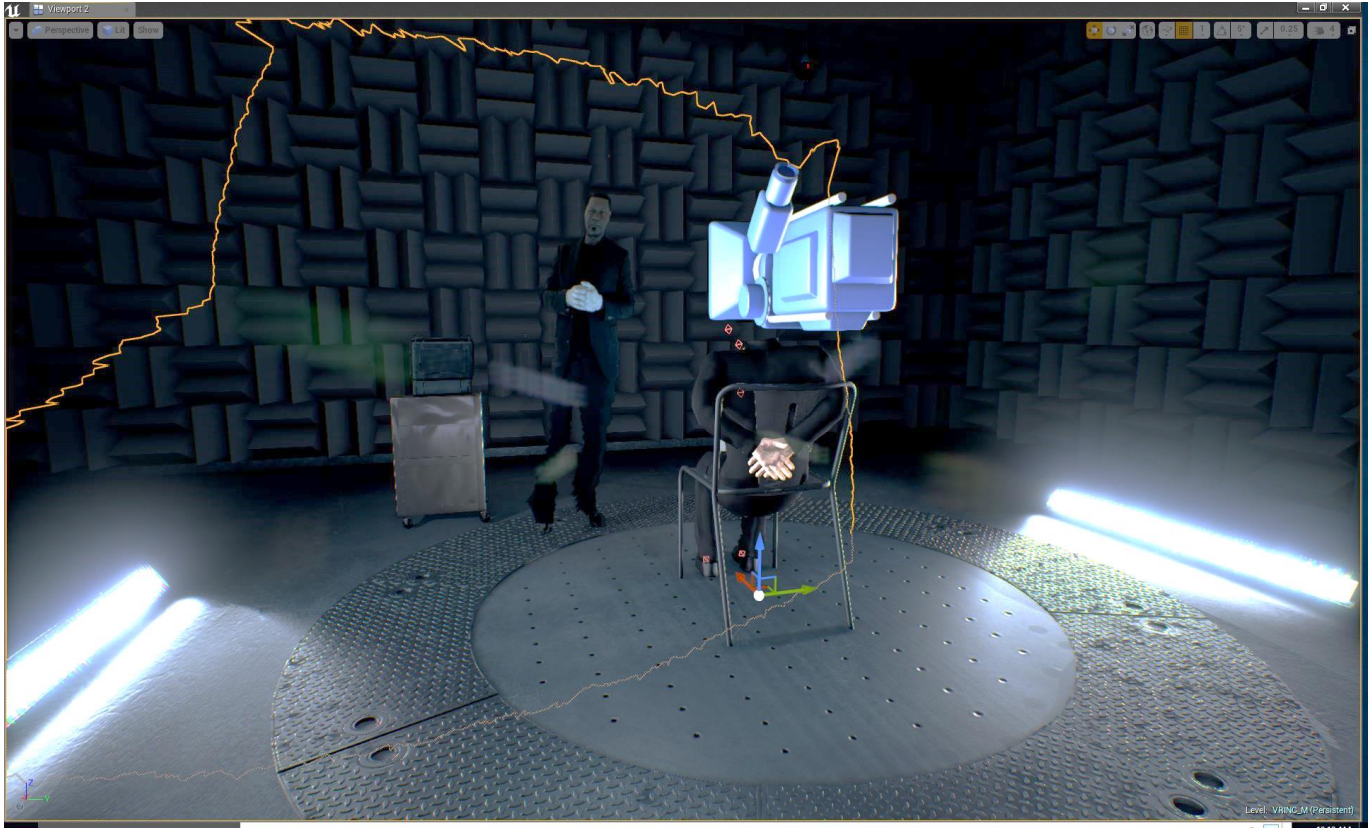
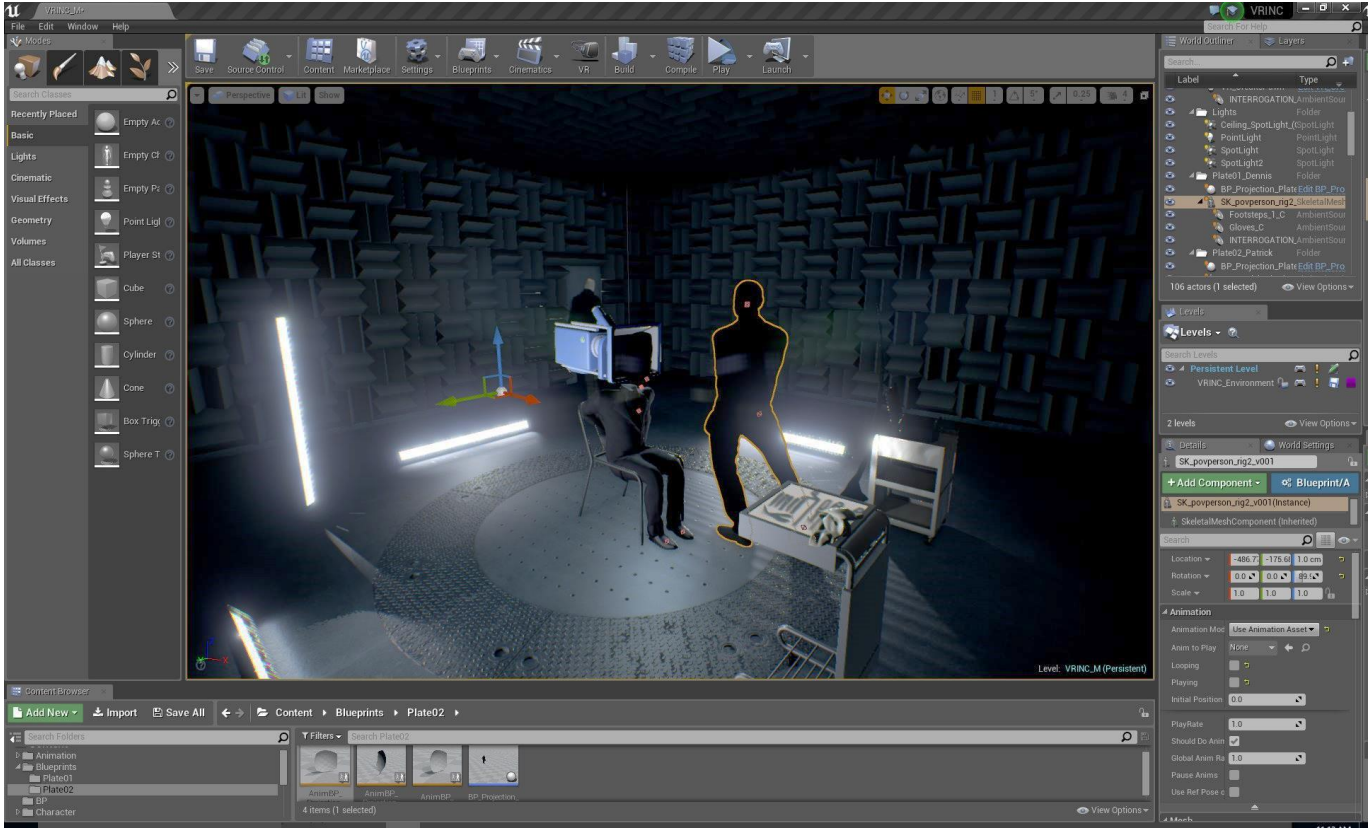
Tessellation Multiplier
Subsurface Color
Custom Data 0
Custom Data 1
Ambient Occlusion
Refraction
Pixel Depth Offset
MATERIAL


Viewport 2
Perspective
Lit
Show
Level: VRINC_M (Persistent)


Viewport 2
Perspective
Lit
Show
Level: VRINC_M (Persistent)


File Edit Window Help
Save Source Control Content Marketplace Settings Blueprints Cinematics VR Build Compile Play Launch
Recently Placed
Basic
Lights
Cinematic
Visual Effects
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Volumes
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Level: VRINC_M (Persistent)
World Outliner
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Lights
Ceiling_SpotLight_(SpotLight
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SpotLight
SpotLight2
Plate01_Dennis
BP_Projection_Plate
SK_povperson_rig2_SkeletalMesh
Footsteps_1_C
Gloves_C
INTERROGATION_AmbientSour
Plate02_Patrick
BP_Projection_Plate
106 actors (1 selected)
View Options
Levels
Search Levels
Persistent Level
VRINC_Environment
2 levels
View Options
Details
World Settings
SK_povperson_rig2_v001
+ Add Component
Blueprint/A
SK_povperson_rig2_v001(Instance)
SkeletalMeshComponent (Inherited)
Location
Rotation
Scale
Animation
Animation Mod
Use Animation Asset
Anim to Play
None
Looping
Playing
Initial Position
PlayRate
Should Do Anim
Global Anim Ra
Pause Anims
Use Ref Pose c
Content Browser
Add New
Import
Save All
Content
Blueprints
Plate02
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Animation
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Plate01
Plate02
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Character
Filters
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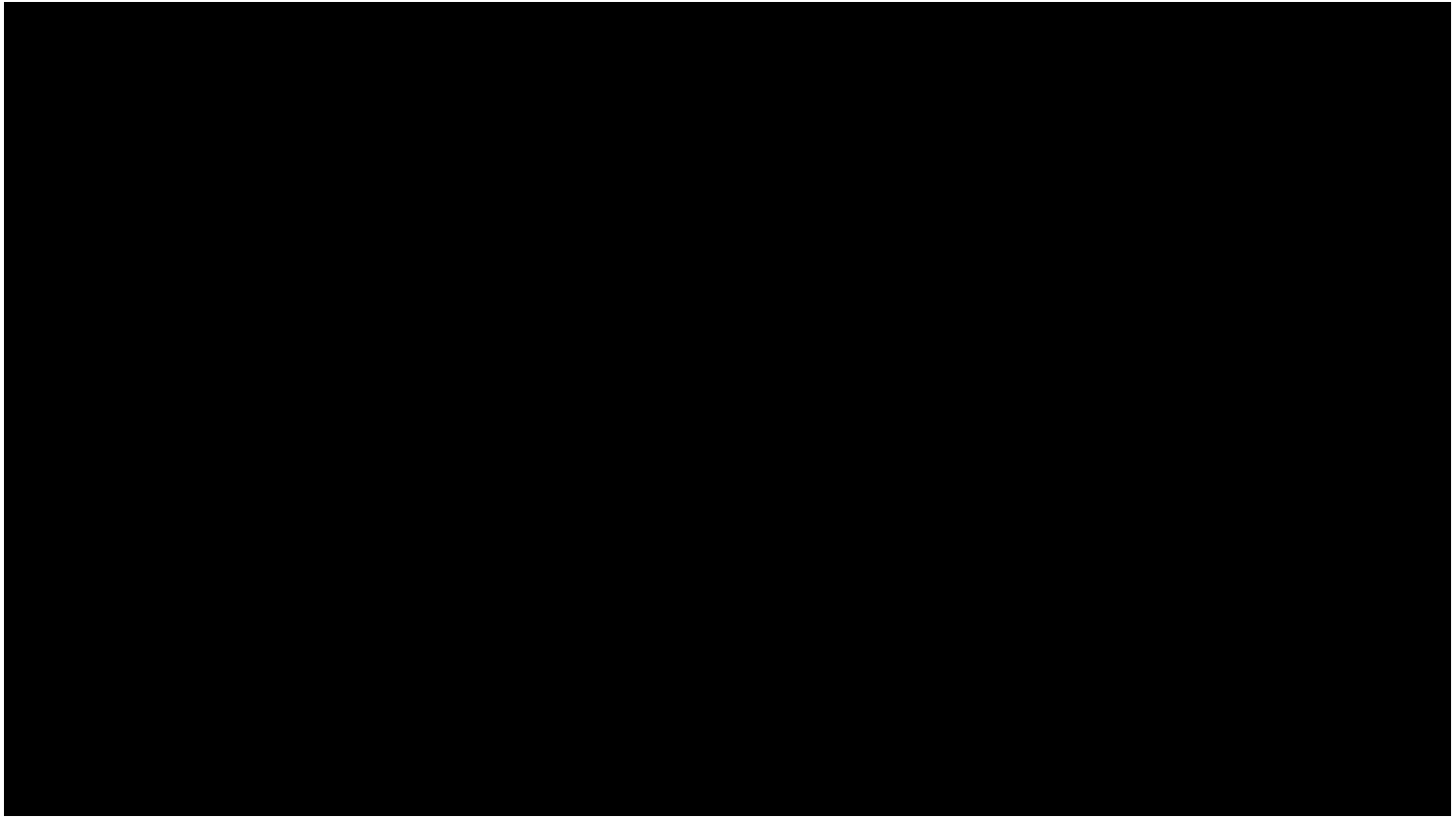
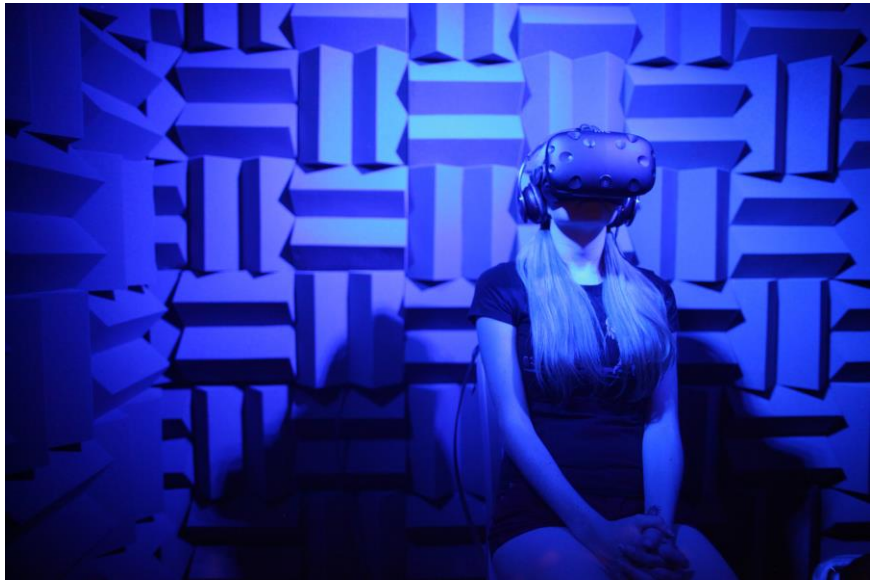
BP_Projection
4 items (1 selected)
View Options





VISIT THE QUIET ROOM
OPEN
10AM - 8PM
EXIT

If we had more time

- Create physical model of actor (on-set Photobooth)
- Matchmove (rotomate) it to the physical performance
- Use live action head for photo-real quality, instead of full body
  - This would allow a real performance, with an animated stereoscopic body
- Vive Trackers on feet and hands would increase immersion
  - We were going down this path and had an effective solution with the HTC Wands, but removed the functionality in the final build

Digital Crew

- **Executive Producer:** Andrew McGovern
- **Live Action Set Producer**: Somyung Richmond

- **Digital Producer**: Peter Nelson
- **CG Supervisor**: Ron Herbst
- **Unreal Lead Programmer**: Julia Lou
- **Assets (Unreal, Maya, Substance):** Joseph Caddell, Ferdinand Vasquez
- **Compositing**: Jason Selfe, Lenz Kol
- **Tracking**: Jon Aghassian
- **Animation**: Kevin Culhane

DIGITALDOMAIN

VIRTUAL REALITY