360° Vision:
Shooting for Live Action VR

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Shooting for VR

- The VR framework
- CGI vs live-action for VR
- Lessons from S3D
- Narrative grammar
- VR camera rigs
- VR narrative rules?

Image: www.gadgethelpline.com/wp-content/uploads/2015/05/apple-VR.jpg
What is VR?

- Uses **S3D** to create an illusion of depth by presenting each eye with a different image in a headset display system.
- Uses head tracking to allow head movement to update the displayed 3D image and audio soundfield.
- Headset has very wide FOV to create immersive experience.
- But low frame rate, lag, or inappropriate camera movement can induce disorientation or even motion sickness.

FOV = Field of View
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CGI vs Live-Action for VR

CGI vs Live Action

CGI
- Generates geometrically perfect VR worlds
- An immersive and interactive game-like environment
- Player controls their motion through the VR world
- Only the current field of view needs to be rendered
**Live Action vs CGI**

**Live Action**
- Many issues around multiple-camera rigs
- 2D or 3D?
- Powerful software needed to sew images together
- User does not control their motion through the VR world
- Whole scene must be rendered
- Adds reality and humanity
- How do we take VR beyond the ‘novelty’ experience?

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**The Future for CGI?**

- While SkyRim may be the future for gaming, what about live-action?

![SkyRim](http://dsky9.com/rift/capture-rig-jauntvr/)
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Lessons from Stereoscopic 3D

3DS & VR Filmography

*Afterlight* (Drama)
*Run* (Comedy)
*Snowdon* (Documentary)
*Pave the Way* (Documentary)
*Back 2 the Wild* (Music)
*The Silver Ghosts* (Music)
*Poundline* (VR Docu-drama, in pre-production)
Perspective lines as depth cue

Image: From ‘Run’

Diagonal framing, smoke and monocular cues

Image: From ‘Snowdon’
Monocular cues give feeling of presence

Exaggerated depth for landscapes
Experiment with hyper-real 3D

Diagonal framing, extended depth, smoke, scale
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Narrative Grammar

Potential Pitfalls with VR...

- Very short shots
- Image unsteadiness
- Dissolves
- Cutting on movement
- Narrow depth of field
- Exaggerated perspective
- Camera moves
Things to Aim for...

- Long visually rich shots/scenes
- Plenty of depth of field
- Slow steady camera moves
- Strong depth cues

- Every shot should work in VR and not break the illusion of the created reality
- Need to produce content that does not conflict with human vision, hearing and balance

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VR Camera Rigs
**Samsung Project Beyond Rig**

- 17 cameras with ultra-wide lenses
- Shoots one gigapixel of video each second

Image: [http://www.ibtimes.co.in/project-beyond-samsung-launches-360-degree-3d-camera-gear-vr-613835](http://www.ibtimes.co.in/project-beyond-samsung-launches-360-degree-3d-camera-gear-vr-613835)

**Google Jump Camera Rig**

- 16 x GoPro cameras
- Does not film directly upwards or downwards
- Is this an issue?
- Stereoscopic – footage rendered in cloud by Google

Jaunt ONE Camera Rig

- 1" sensor cameras
- Delivers a 4k image per eye at 60fps
- Provides preview via USB
- Only available to Jaunt’s creative partners
- Computes a stereoscopic image
- Stitching & processing via Jaunt's cloud server

Eye™ Professional VR Camera Rig

- 42 Blackmagic Microcinema cameras with Rokinon lenses
- Costs $135,000 - $155,000

Images:
- Eye™ Professional VR Camera Rig: http://360designs.io/product/eye-vr-camera-full-3-axis-package/
Huccio Camera Rig

- 7 x Red Epic Dragon cameras
- Developed to make adult films
- 1.7 TByte per hour


Hype VR Camera Rig

- 14 x Red Dragon cameras
- Uses LiDAR (Light Detection And Ranging) to capture depth map

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VR Narrative Rules?

Use to Help Tell Story

- **Audio cues** – need to be in 3D, i.e. binaural for headsets
- **Lighting cues** – in front field of view
- **Action cues** – in front field of view
- Film in a naturalistic way to minimise brain conflicts
- Viewer can be distant observer, e.g. ‘Eye of God’
- Viewer can be close observer
- Viewer can be participant
- Mise-en-scène – let the action unfold around the camera
Current Research Project

Collaborating with Caroline Orme, my research colleague from Ravensbourne
Producing a short docu-drama in 3DS and VR
Currently in planning/pre-production
  Can we tell the same story?
  Will the impact be different?