

VR Best Practices: Putting the Fun in VR Funhouse

Amanda Bott - March 3, 2017



Overview

- Getting Started
- Design
- Haptics
- High-end Rendering
- Simulated Effects
- Audio
- Performance
- Tools
- Modding



In the Beginning



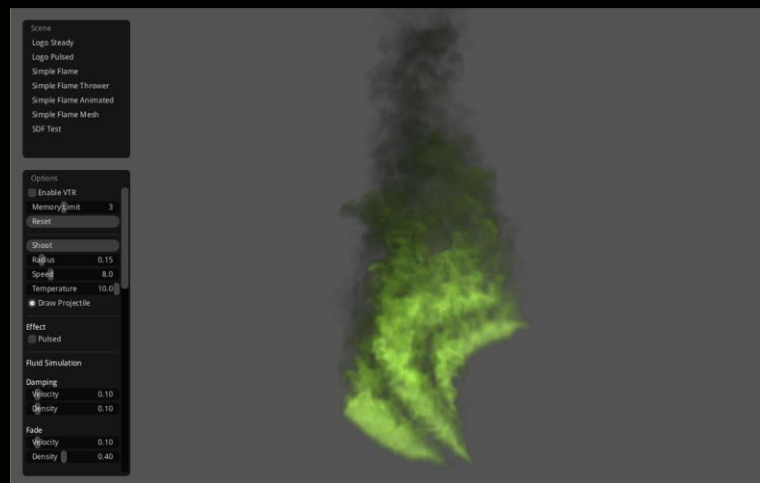
The Tech



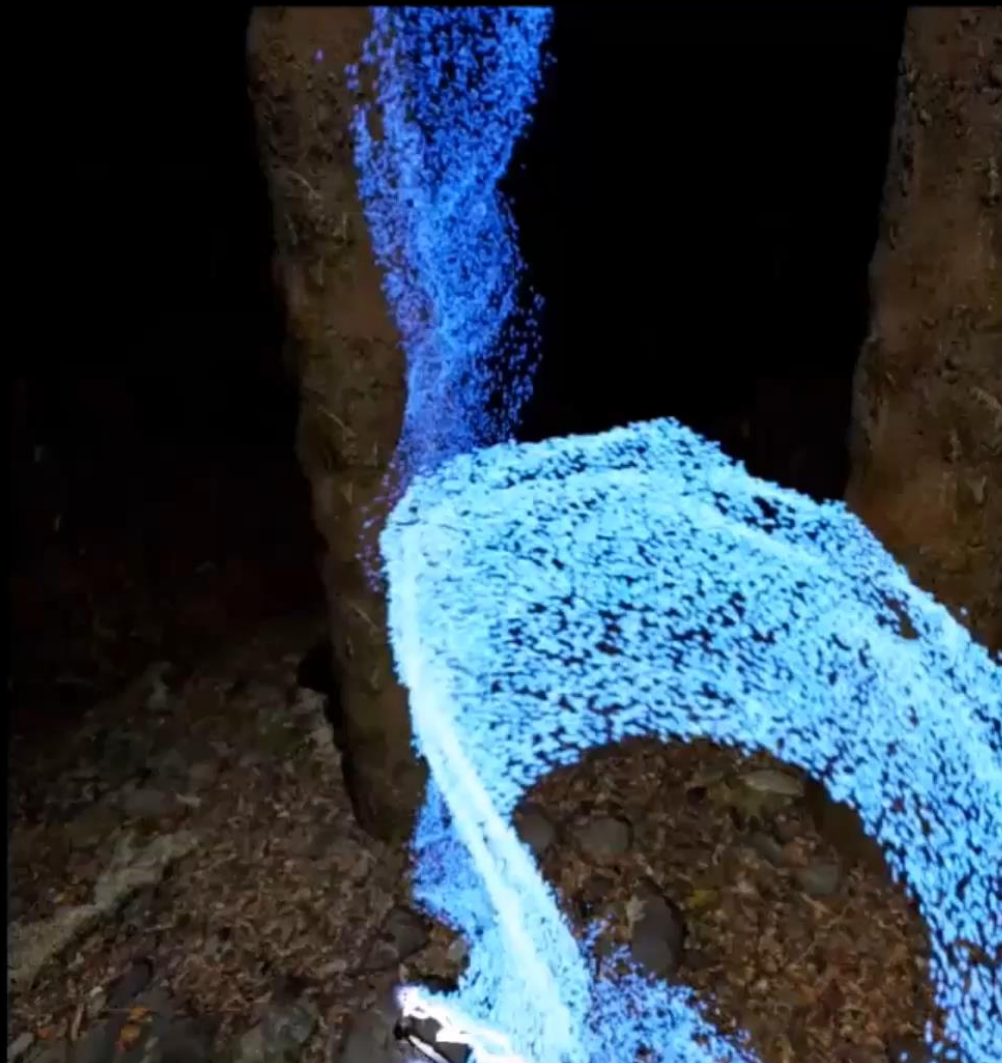
FleX



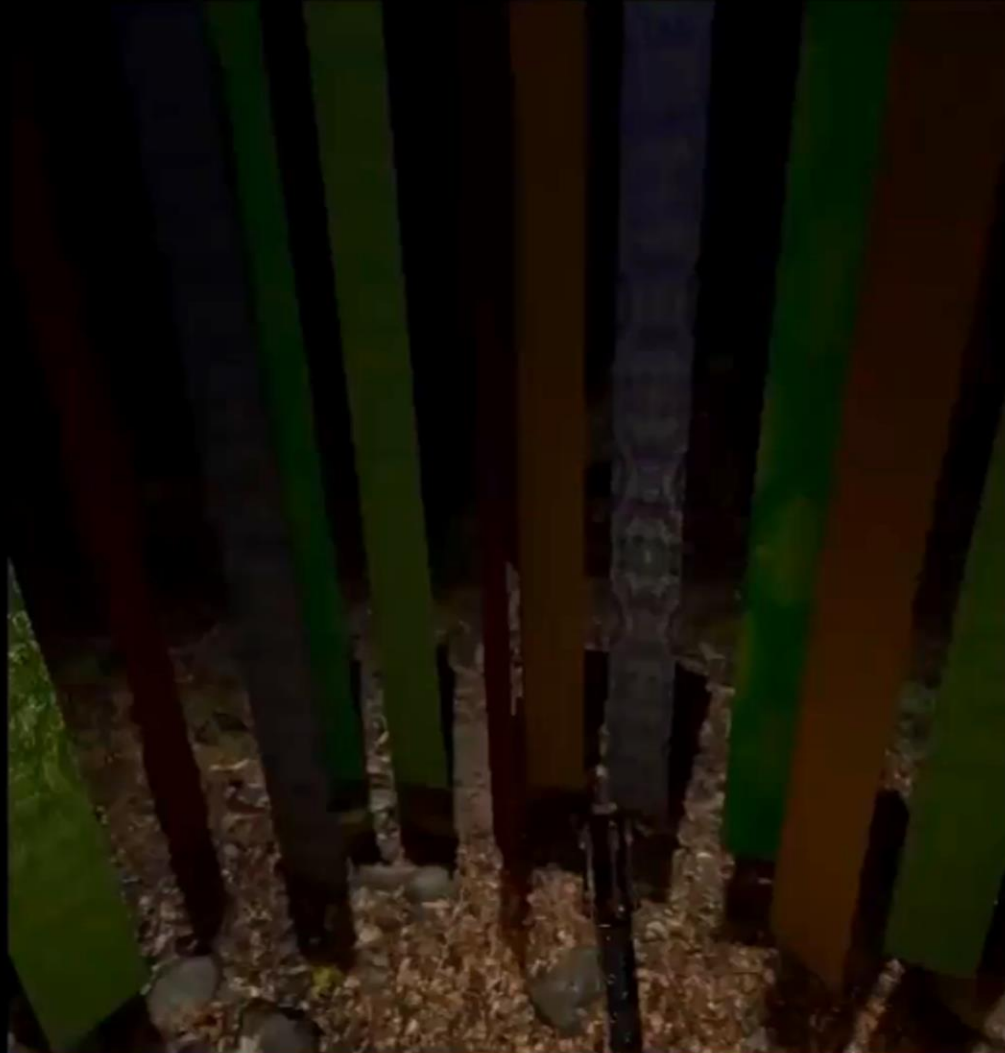
PhysX Destruction



Flow







Early Design Decisions

- Design for your target platform
- Experience
 - Real Buttons
 - Haptics
- Determine an art style and stick to it
 - Realistic Rendering with non-realistic design
 - PBR Materials and Photogrammetry - intentionally stylized



Theme

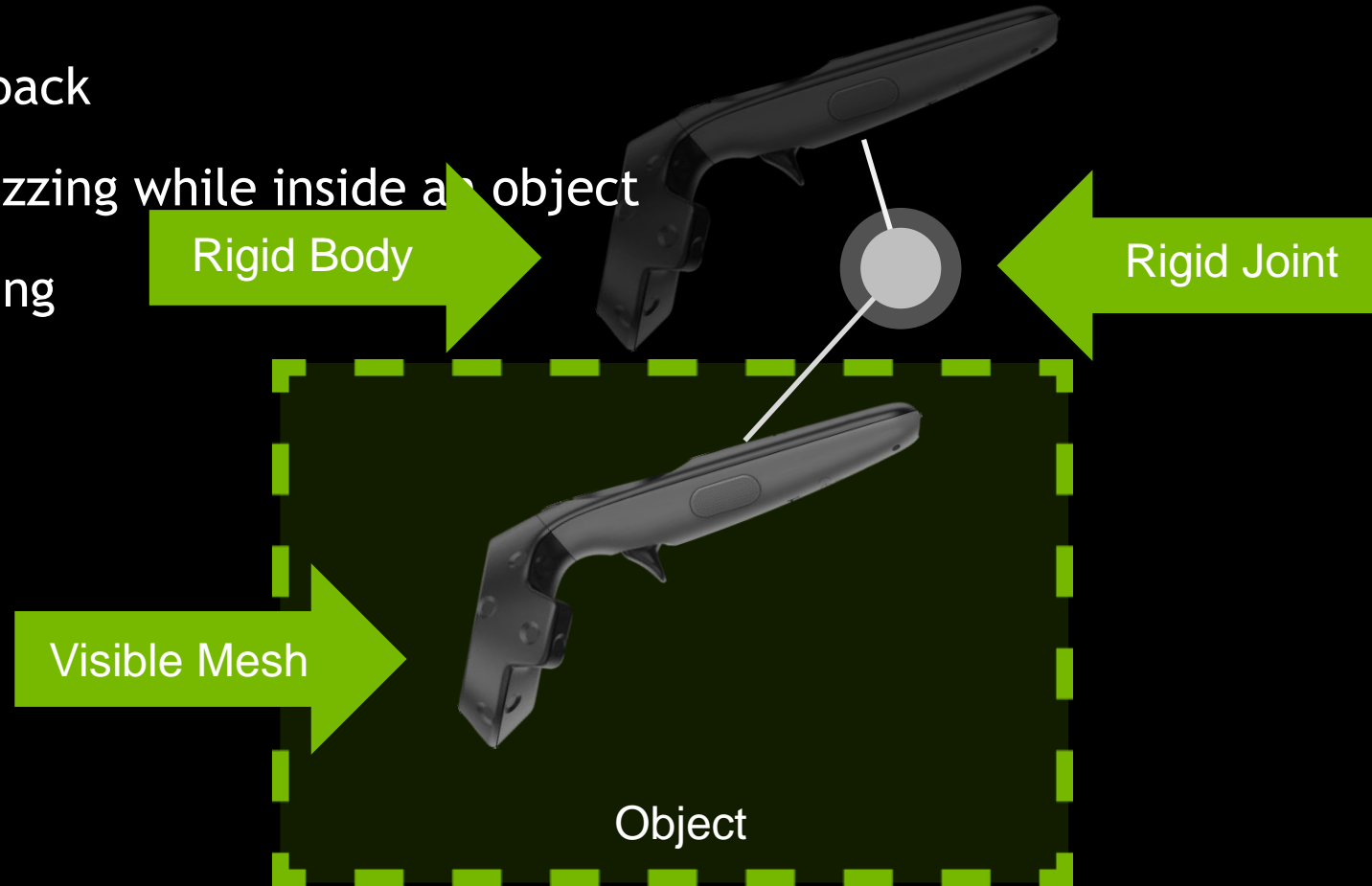


Haptics



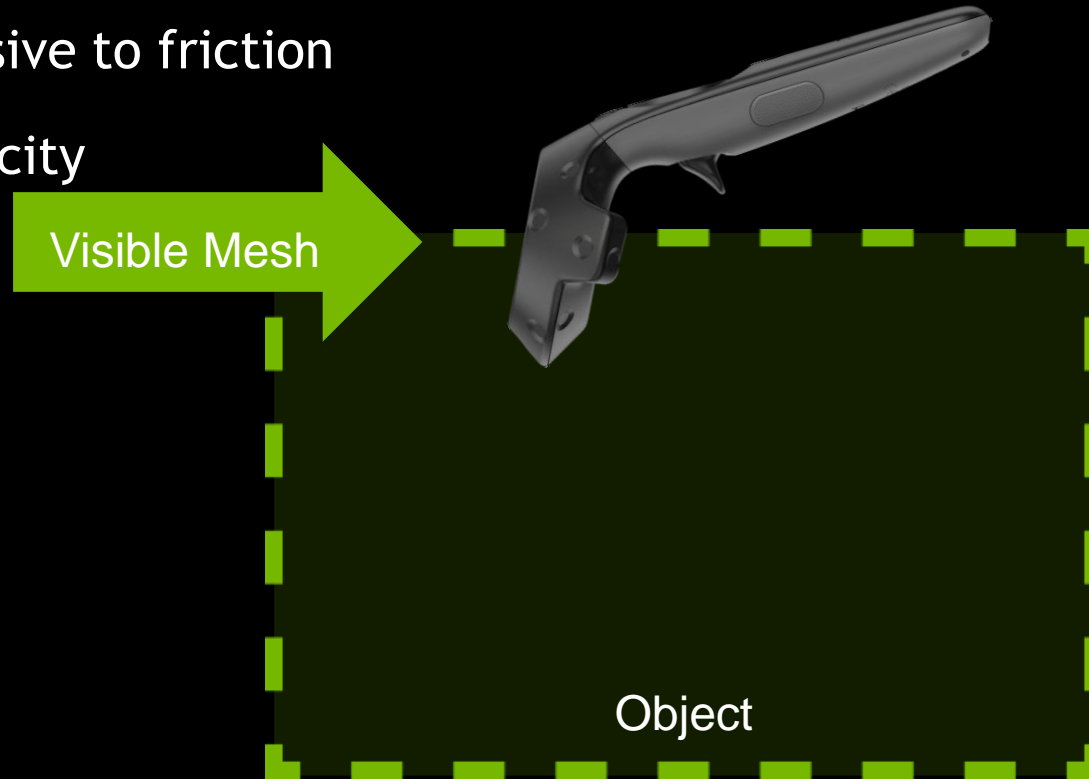
Haptics - Rigid Joint

- Great Feedback
- Constant buzzing while inside an object
- Overwhelming



Haptics - Overlap Event

- Doesn't buzz constantly
- Less responsive to friction
- Tied to velocity



Haptics

- Bow
 - Every tick - check for distance between the hands
 - Added a tiny buzz when bow is drawn to max



Haptics

- User Options
- Material Based Haptics
- Greater fidelity in the controller

High-end Rendering

- Unreal Engine 4
- Use Shadows
- Eye-catching
- Don't hold yourself to a Min Spec



High-end Rendering

- Destroys your Min Spec
 - Have a high Min Spec OR
 - Visual Quality suffers

SYSTEM REQUIREMENTS

MINIMUM:

OS: Windows 7

Processor: Intel® Core™ i7 4790 or greater

Memory: 8 GB RAM

Graphics: GeForce® GTX 1060 6GB

DirectX: Version 11

Storage: 5 GB available space

RECOMMENDED:

OS: Windows 10 TH2

Processor: Intel® Core™ i7 5930 or greater

Memory: 8 GB RAM

Graphics: GeForce® GTX 1080

DirectX: Version 12

Storage: 5 GB available space

Additional Notes: For maximum performance, it's recommended to have 2 GPUs with one in dedicated PhysX mode.

Simulated Effects - FleX

- Simulated fluid in 3 dimensions at 90hz!
- Simulate what you can do well.



Simulated Effects - FleX

- Collision
- Expensive
- Limited Direct Interaction (from code)



Simulated Effects - Turbulence



Simulated Effects - Flow



- Need real-time, volumetric emitters for Flow
- Be mindful of your simulation

Simulated Effects - HairWorks

- Editable in UE4
- Use limited dynamic lighting
- Place assets mindfully
- Temporal AA is your friend



Simulated Effects - Destruction

- Mind your chunk levels
- Swap for static meshes?
- Utilize only what you need



Audio

- Motion Tracking
 - Hit impulses
 - Component Velocity



Audio

- Simulated Physics - FleX
 - No Hit Events
 - No Overlap Events
 - Use Containers

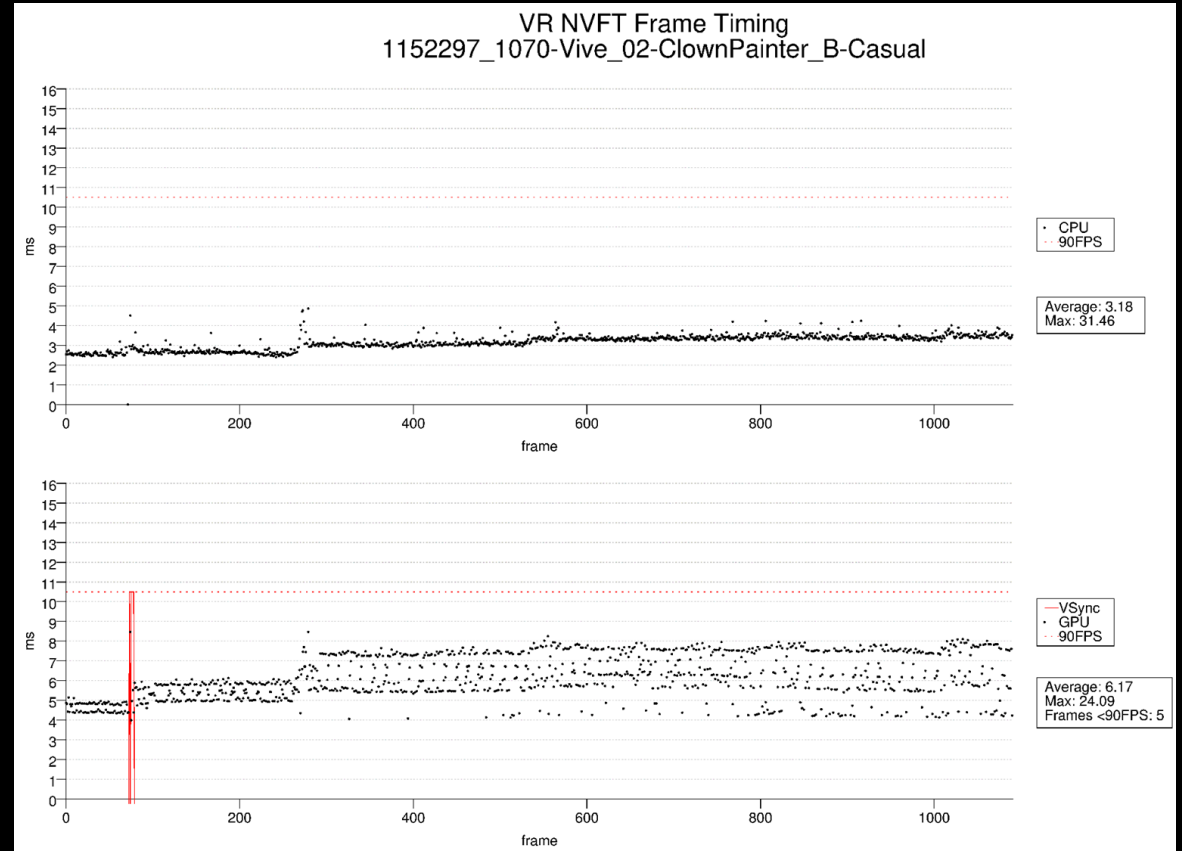


- Targets for VR
 - 90 FPS (~11.11ms/frame)
 - Give the platform 1 ms of buffer



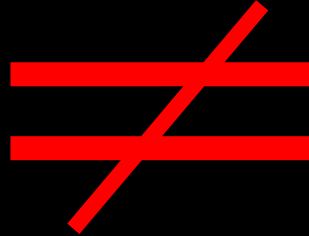
Performance

- FCAT VR
 - Perf recoding system



Performance

- Make sure all individuals in the pipeline are testing on an HMD



Performance

- Automated playback system

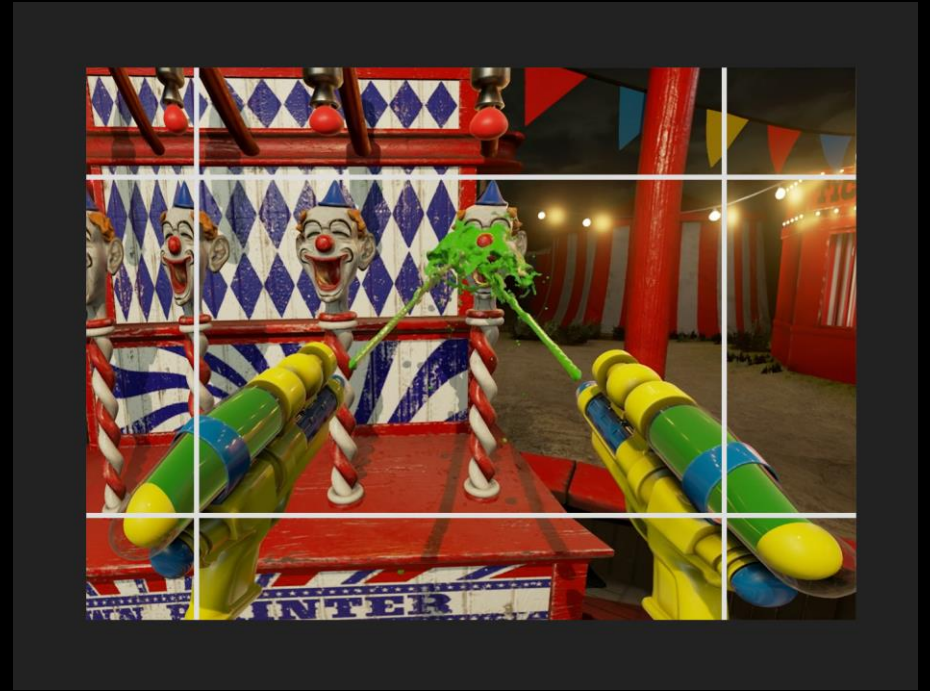


Performance

- Settings
 - Define your Low, Medium, High
 - Screen Percentage
 - MRS (Multi-Res Shading)
 - Post Process AA
 - Shadow Quality



Performance - MRS



Performance

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Performance

- Doubt about which system to blame:
 - GPU
 - Driver
 - SteamVR/Oculus
 - UE4
 - UE4 integrations
 - Content
 - OS (TH2, RS1, Win7)
 - Settings



Performance

- Find a way to isolate the issue
 - Automate builds
 - Swap Drivers
 - OS Images
- Form good relationships with external developers



Tools

- Unreal Engine 4
- 3D Coat
- HairWorks
- PhysXLab
- Lightwave
- Autodesk 3DS Max & Maya
- Adobe Products

Modding

- Give it all away!



Modding

- Steam Workshop Support
 - Asset/Map Override System
 - Fetched User Generated Content



Modding

Mod Kit includes:

- Editor
- All assets



Final Notes

- Look for ways to improve the player's experience
 - Added teleport and long-distance grab
- Design
 - Repeatability of gameplay

Go make a VR experience!

- VRWorks
 - <https://developer.nvidia.com/vrworks>
- GameWorks
 - <https://developer.nvidia.com/gameworks>
- Epic Games Launcher
 - <https://epicgames.com/>
- Mod Kit Information
 - <https://developer.nvidia.com/vr-funhouse-mod-kit>



Contact us!

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